- Marathon-Southern's Naheola mill
- Advantages of the Magnefite process
- Classification of adhesives
- Are you prepared for the 60's?

The Paper Industry

Publishers of PAPER AND PULP MILL CATALOGUE

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Marathon-Southern's $40,000,000 Naheola mill. See page 662.

Our 40th Year January 1959

"I want to be kept informed"

No matter what your job is, it's natural to want to know what's going on in your company in order to work most efficiently. Send us your ideas on why, when, how and of what you want to be kept informed.

12th BOLTON AWARD

(Annual Essay Contest)

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Chicago, Illinois
and
JOHN W. BOLTON & SONS, INC.
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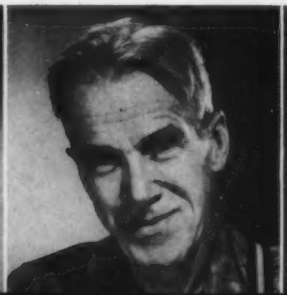
CONTEST RULES

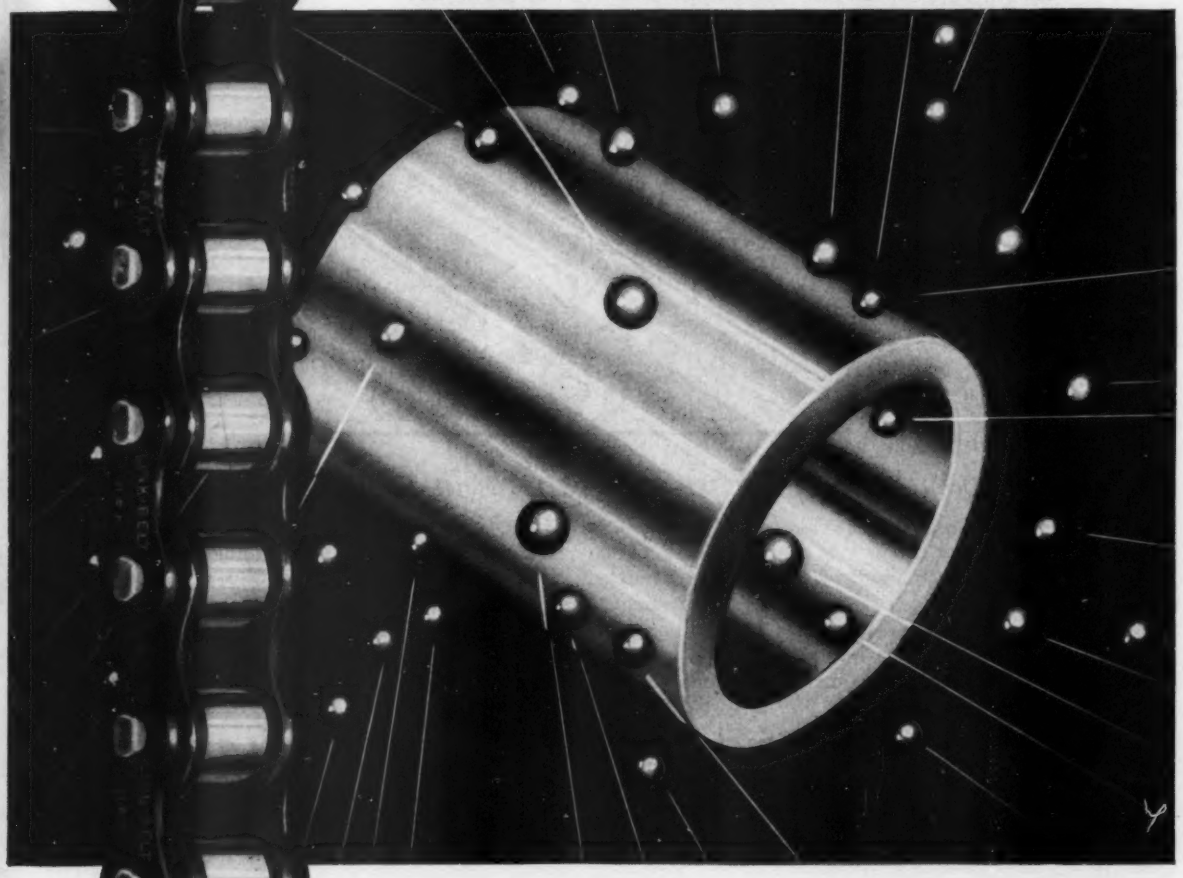
1. The contest is open to all employees of pulp and paper mills in North America.
2. Your paper should be confined to 1500 words, typed with double spacing on one side only of plain sheets, 8½" x 11".
3. Place your name, the name and address of your mill, your position or duties and your home address on the cover sheet only. This information must not appear in the manuscript.
4. Mail your entry before midnight March 31, 1959 to:
   The Secretary and Treasurer, The American Pulp and Paper Mill Superintendents Association, 327 So. LaSalle Street, Chicago 4, Illinois.



Shining example of "extra" chain quality

SILVER-BRITE

SHOT-PEENED ROLLERS



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LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants, Sales Offices, Stock Carrying Factory Branch Stores and Distributors in All Principal Cities. Export Office, New York 7; Australia, Marrickville (Sydney); Brazil, Sao Paulo; Canada, Scarboro (Toronto 13); South Africa, Springs. Representatives Throughout the World. 14,976

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Three new modified gum rosin sizes now in use across the country!

Trust the leader in the industry to come up with the first and the finest. Cyanamid's vast, diversified and expanding research program is constantly up-grading and improving all Cyanamid products. And our three, fine, new *modified gum* sizes have been developed out of this research. Look them over yourself. They offer new economies in shipping and storage (Cyanamid's 80% solids fortified size is an exclusive in the industry) . . . minimum foam characteristics for top size efficiency (you can make less go farther, or use the same amount for a more highly sized end product) . . . and better color, for highest paper brilliance.

***NEW!* ACCOBRITE® ROSIN SIZE 4028**
—Unfortified modified gum rosin size . . . shipped as 80% solids. Has excellent color, low foam. Ideal for use in board . . . and much lower in cost than fortified size. One of the lightest-colored sizes available—and the most efficient!

***NEW!* CYFOR® ROSIN SIZE 4016A**
—A top-grade, fully fortified, 70% solids, modified gum size. Its low foam means highest size efficiency . . . and its good color (and competitive price) make it an excellent choice for mills making book, bond, ledger and board.

***NEW!* CYFOR® ROSIN SIZE 4029**
—Save on shipping and storage with this exclusive, 80% solids, fortified size! Cyanamid is the only manufacturer making it. What's more, the General Electric Brightness Indicator shows this size to have extra-light color. It contains the same high-quality gum rosin used in 4028!

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...Fluid Power news

REPORT NO. 12,103
"HYTAC"* SYSTEMS ON NEW PAPER MACHINE

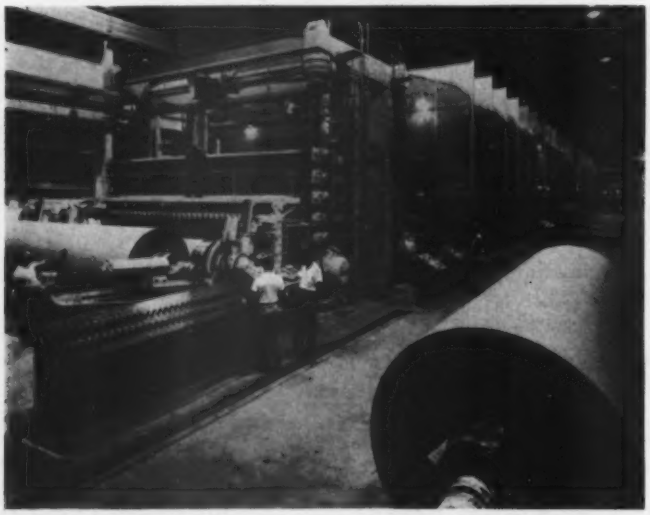
From Oilgear Application-Engineering Files

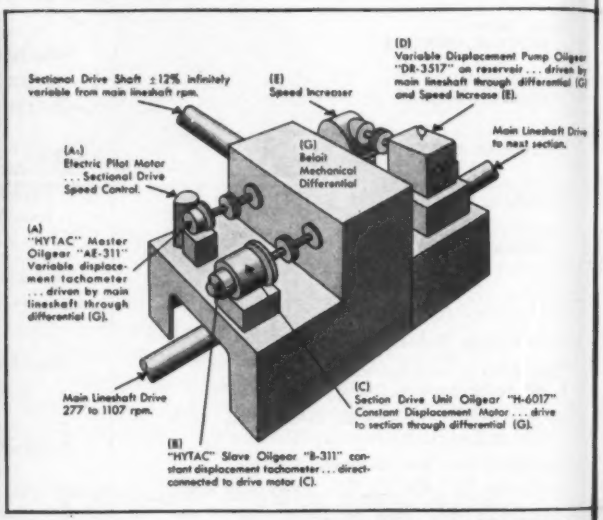
HOW OILGEAR "*ANY-SPEED*" DRIVES ON NEW PAPER MACHINE ACCURATELY CONTROL SECTION SPEEDS

USER: *West Virginia Pulp and Paper Company (Westvaco) (Builder—Beloit Iron Works, Beloit, Wisconsin)*

DATA: Systems to individually vary and accurately control speeds on four sections of a new, 264-in., $25,000,000 paper machine that will produce up to 225 tons daily of a revolutionary, patented, smooth, extensible kraft sheet. Machine is powered from a block-long main lineshaft with mechanical differentials at each section. Main lineshaft speed will vary over a 4:1 range—from 277 to 1107 rpm.

REQUIREMENTS: 1. A system that, when applied to each of four mechanical differentials, will provide individual, precision-controlled, infinitely variable increase or decrease of 10% over or under main lineshaft speed—as selected from 2 local, and 7 remote push-button stations. 2. Each system to maintain selected speed for its section within ±0.25% max. variation over a 50% load change at max. lineshaft speed. 3. Systems must also be: a. Compact. b. Impervious to moisture and daily high-pressure "wash-down." c. Thrifty on electrical power input. d. Trouble-free for continuous, heavy-duty, full-production paper machine drive service.



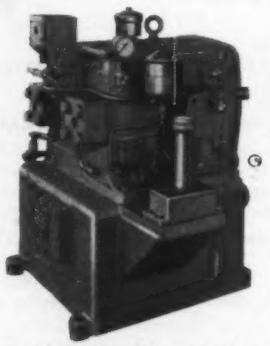

(D) Variable Displacement Pump Oilgear "DR-3517" on reservoir . . . driven by main lineshaft through differential (G) and Speed Increase (E).
Sectional Drive Shaft ±12% infinitely variable from main lineshaft rpm.
(E) Speed Increaser
Main Lineshaft Drive to next section.
(A1) Electric Pilot Motor . . . Sectional Drive Speed Control.
(G) Beloit Mechanical Differential
(A) "HYTAC" Master Oilgear "AE-311" Variable displacement tachometer . . . driven by main lineshaft through differential (G).
Main Lineshaft Drive 277 to 1107 rpm.
(C) Section Drive Unit Oilgear "H-6017" Constant Displacement Motor . . . drive to section through differential (G).
(B) "HYTAC" Slave Oilgear "B-311" constant displacement tachometer . . . direct-connected to drive motor (C).

SOLUTION: *Application-Engineered* Oilgear *Hytac** (hydraulic tachometer) controlled drives provide precise, individual speed control on each of four sections—3rd dryer, 1st calender, 2nd calender, and winder reel of Westvaco's new #3 kraft machine shown above. Drawing, above right, shows components of typical sectional drive. *These highly accurate, compact, heavy-duty systems have met or exceeded all originally specified requirements.* Examples: 1. Specified ±10% infinitely variable sectional speed control range exceeded by providing ±12% in actual operation. 2. Selected speeds are maintained within specified limits *regardless* of load change. 3. Production speeds increased to over 2000 fpm. Important "Oilgear-plus" features are: 1. Dual winder control that, with the mere flip of a control panel switch, converts winder drive from speed-controlled to tension-controlled . . . speed control prevents tearing the tail strip when starting a new core, while tension control provides good roll quality at full sheet width. 2. Cushioned, controlled acceleration and deceleration. 3. Positive overload protection. 4. Pressure and flood lubrication with continuous power fluid filtration.

OPERATION: Fluid from master tach (A) gives section drive speed command to control on pump (D). Slave tach (B) feeds back a flow signal proportional to actual section drive speed. When main lineshaft speed is increased or decreased, fluid flow from master tach (A) automatically increases or decreases to command section drive to follow lineshaft speed change. Through local or remote pushbutton stations connected to electric pilot motor (A_1) on master tach (A), operator can increase or decrease speed of each *Hytac* section infinitely up to 12% of prevailing lineshaft speed.

A second Westvaco kraft machine will have an *Application-Engineered* Oilgear Controlled Motion System to cover a 10:1 lineshaft speed range, and a wider sectional

*"HYTAC" Systems—An Oilgear Trademark



Left: Oilgear Sectional Drive Pump (D) with integral reservoir. *Right:* Oilgear Sectional Drive Motor (C) with direct-connected *Hytac* slave (B) to left.

Fluid Power drives and controls were selected after three years of development on this process and machine—from a 2-in. table model, through a 15-in. laboratory model and 60-in. pilot model. Conventional variable speed drives could not provide the sectional speed control required. "*Equipped with the most advanced precision controls known to the industry . . .*"—is the statement Westvaco has made concerning their new #3 machine.

. . . for the lowest cost per year—it's Oilgear!

For similar practical solutions to YOUR linear or rotary Controlled Motion problems, call the factory-trained Oilgear Application Engineer in your vicinity. Or write, stating your specific requirements, directly to . . .

THE OILGEAR COMPANY

Application-Engineered Controlled Motion Systems

1565 WEST PIERCE STREET • MILWAUKEE 4, WISCONSIN

From our point of view..

Will the Magnefite process cause a return-swing to sulfite pulping?

THE MAGNEFITE PROCESS, a new sulfite process developed and fully tested by Howard Smith at its Cornwall mill, promises to win rapid acceptance by the pulp and paper industry as evidenced by the worldwide interest it has aroused since its announcement early this year. The process (see its description in this issue) uses magnesium hydroxide as the basic raw material. Magnesium hydroxide is converted to magnesium bisulfite in a simple mixing operation employing a venturi and strong- and weak-liquor tanks.

There is no excess SO_2 in the cooking liquor, as is the case with the calcium bisulfite process where large quantities of SO_2 are required to dissolve limestone and to hold the calcium bisulfite in solution. This eliminates pressure problems and decreases cooking time since the rate of heating the liquor is not critical. The digester can be brought up to cooking temperature in about an hour without the danger of causing chip burns.

The shortened cooking cycle means increased digester capacity of about 50-100 per cent. Further advantages are a simplified chemicals recovery system with consequent elimination of stream pollution problems associated with sufite pulping; the adaption of the method to a continuous pulping process, as well as to semichemical pulping permitting the use of the same chemicals recovery system for both processes; the ability to pulp nearly all wood species, mixed in a single batch digester if desired; a more economical use of water and heat; increases in pulp yields which amount to more than 5 per cent; greater pulp strengths, approaching those of the sulfate pulps and at the same time retaining the easy bleaching characteristics of the sulfite pulps.

In recent years the sulfate process, with the advantage of its chemical recovery system, has become increasingly popular, to the point that it currently holds a dominant position in the pulping industry. The Magnefite process which, according to its developers, simplifies the cooking operation and the recovery of chemicals from used cooking liquor now introduces factors that promise major savings in capital, maintenance and operating costs.

The Howard Smith development may therefore not only give the sulfite process a new lease on life but — should the claimed advantages be widely substantiated — actually cause a marked return-swing to sulfite pulping in this country.

ALBANY FELT PERSONNEL ASSEMBLED AT MAIN PLANT. PICTURED HERE IS AP

WHAT'S BEHIND THE ALBANY SALES ENGINEER...

Backing up the Albany Sales Engineer who regularly calls at your mill is an outstanding team — available to serve your needs at any time. Each Sales Engineer can call into action all or part of this army of highly trained specialists to help solve your felt problems, and you can be sure everyone at Albany from the top down has the papermaker's interest at heart.

You receive the benefit of your Sales Engineer's practical experience PLUS the pooled know-how of a force of over 1500 — the people who have made Albany Felt Company today's leader in the field.

As experts in their own right and as liaison between the papermaker and the world's largest felt manufacturer, Albany Sales Engineers rightfully take a prominent place in "The Big Picture" — furthering the customers' objective of producing *more saleable tons per day.*

ALBANY FELT COMPANY

MAIN OFFICE & PLANT, ALBANY, N. Y.

OTHER PLANTS: HOOSICK FALLS, N.Y.; N. MONMOUTH, ME.; ST. STEPHEN, S.C.; COWANSVILLE, P.Q.

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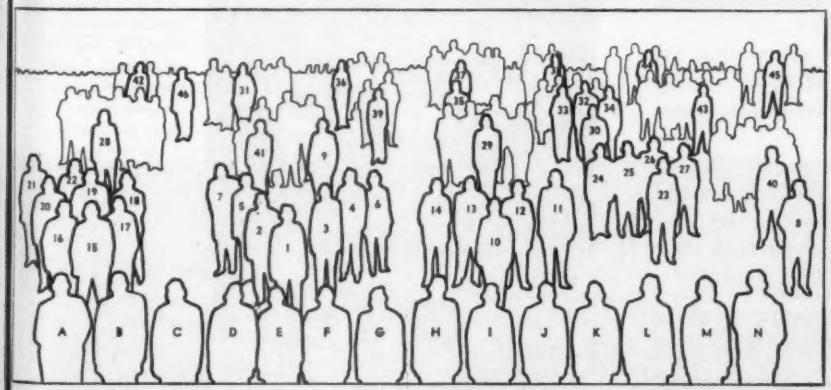

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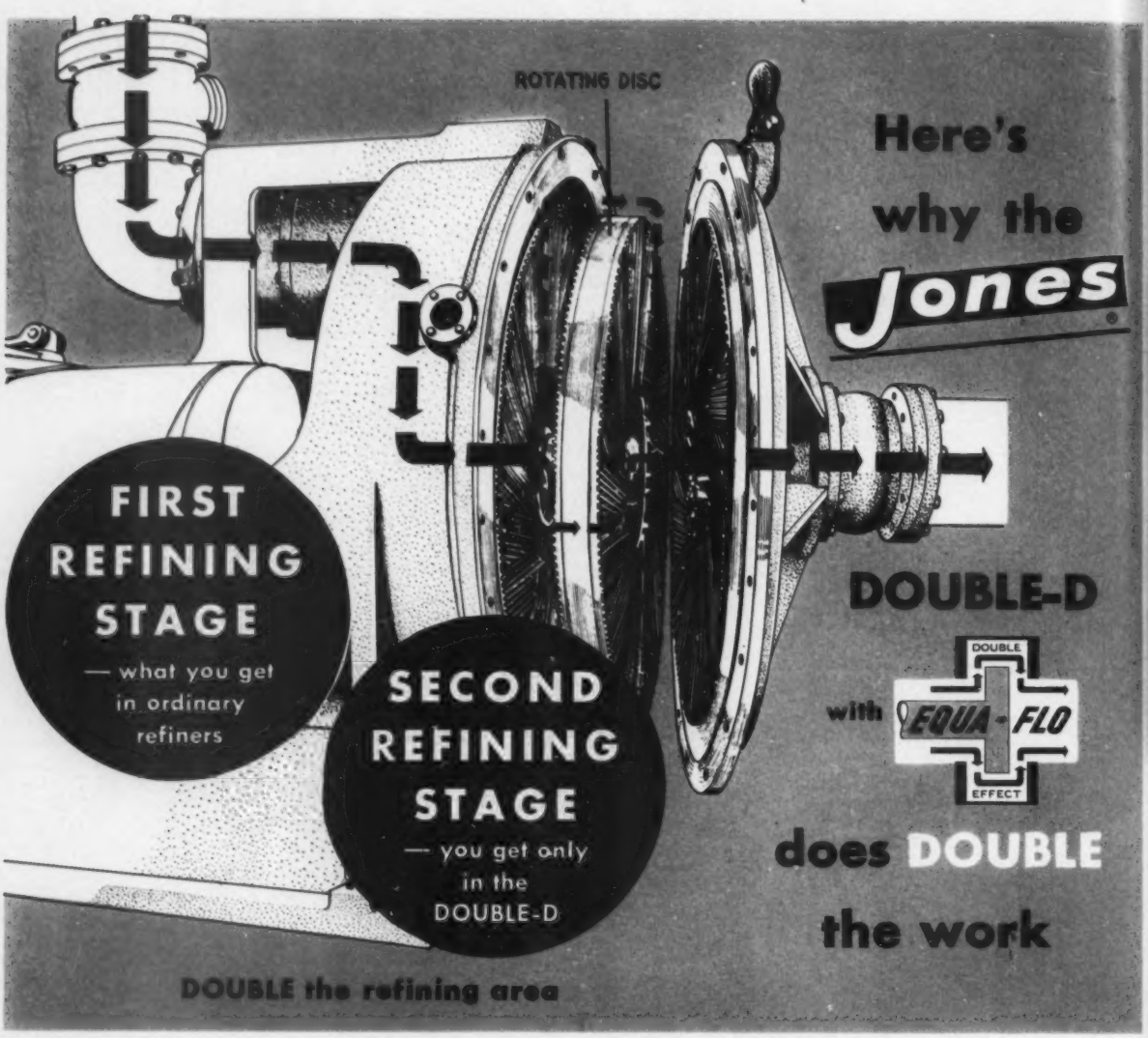
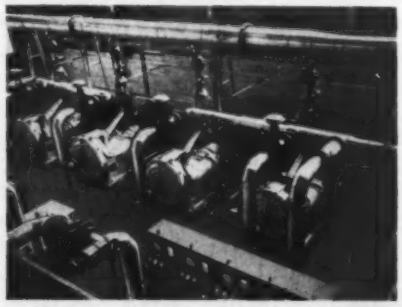


This "double-effect" of the Jones DOUBLE-D is the reason you get double the work — two stages of refining in one pass.

Equally important, mills everywhere report that the DOUBLE-D Refiner produces stock of better quality than conventional machines, with less horsepower hours per ton.

And because it is fully pressurized, the DOUBLE-D is economical to install, economical to maintain and extra-efficient in operation. Get the details — ask your Jones representative or write us for Bulletin EDJ 1083.



A typical installation - some of the 10 DOUBLE-D's at St. Regis Paper Company's Jacksonville plant. Note the piping - as simple as a Jordan's.

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Builders of Quality Stock Preparation Machinery

DRAMATIC MOMENTS IN PAPER-MAKING PROGRESS

What can match the thrill of the first run on a new paper-making machine? *Only 90 minutes after the first start-up, press-ready paper was produced at Southland Paper Mills, Lufkin, Texas* on a new Pusey and Jones Fourdrinier machine.

This new machine was a huge, 270-inch wire-width Fourdrinier, the third complete paper-making machine designed, built and installed by Pusey and Jones for Southland. It typifies Pusey and Jones' ability to provide on-time start-ups for paper mills the world around.

Top photograph: *Wire of new Southland machine being moved into operating position as it rests on the power-operated undercarriage of Pusey and Jones' Rapi-Drape Wire Changing Device.*

Bottom photograph: *Overall view of new Southland Paper Mills machine.*

Data on Southland's New Fourdrinier Machine:

Wire Width, length and speed: 270" wide x 118' long. Speed: 2500 f.p.m.

Number of presses: Two 42" diameter main suction press rolls, complete with vacuum pickup.

Dryers: 53 main paper dryers; one sweat dryer; 8 felt dryers; 60" diameter x 268" face.

Calendar stacks: One, 8-roll with 40" diameter bottom roll, 26" diameter next-to-bottom roll, and six 18" diameter intermediate and top rolls.

Reel: Latest horizontal, uniform-speed type.

THE PUSEY AND JONES CORPORATION

WILMINGTON 99, DELAWARE

New Invention Picks Up 40 Cu. Yd. Detachable Containers . . . 15-Ton Loads

Dinosaur picks up in excess of 30,000 pounds of granular material, white line inside container indicates load has not shifted.

DEMPSTER-DINOSAUR Combines Detachable Container Flexibility With Big Pay-Load Capacity

Unlimited Capacity

The proven savings of mechanically handled detachable containers have now been expanded to cover long, over-the-road hauls. Two DINOSAUR models are available for this work. One, for tandem trucks, handles 30,000 pounds; the other, for single axle trucks, handles 22,000 pounds. Special off-the-road models are available for loads limited only by the capacity of the truck.

For Docks and Flat Cars

Mechanically, the DEMPSTER-DINOSAUR is of extremely simple design. Components are a tipping frame, two hydraulic raise-and-lower cylinders and a double-acting cylinder which controls all container movements. No chains, sheaves or cables are used in its operation. It is the only over-the-road system that can push and pull containers on and off docks or railroad flat cars. This makes it possible to use the DINOSAUR in conjunction with "boxy-back" containerized cargo rail shipments.

The Dinosaur hydraulically pushes a container off on a dock and inside a building for unloading.

Many Sizes and Types of Containers are Available

DEMPSTER-DINOSAUR standard containers come in 21 sizes ranging from 14½ feet to 23½ feet in length and 10 to 41 cu. yd. capacity. Special cargo containers up to 35 feet, tank-type and stake side models are also available. Drop-down telescopic legs to hold container at dock height are optional on some cargo containers.

Free Booklet Offered

A free booklet which describes the operation of this new system in detail is offered by Dempster Brothers, the originator and only manufacturer of DEMPSTER-DUMPSTER Systems.

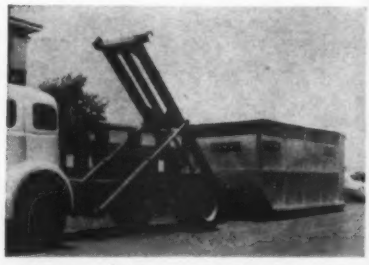
Mfd. By Patents Pending

DEMPSTER BROTHERS, Inc.

Dept. PI-1, Knoxville 17, Tenn.

Containerized Cargo, Waste & Raw Materials Handled by DINOSAUR

The newly developed DEMPSTER-DINOSAUR is a system of materials handling that employs giant containers up to 40 cubic yards and larger. It lends itself to any situation where bulk accumulations of raw materials, liquids, waste or finished products must be handled. Since one truck and one driver can automatically pick up, haul and dump or set down a number of containers, the DINOSAUR easily does the work of several trucks.



Dinosaur backs up to loaded container and engages it with lifting bail.

Container is hydraulically pulled up inclined tilting frame.

Container is pulled forward where it automatically locks into carrying position.

SULPHUR

ONE OF THE FOUR STRONG PILLARS OF PROCESSING

...BUT WHAT A 2% !

A recently compiled breakdown of Sulphur consumption in the United States, shows about 2% of the Sulphur goes into the manufacture of insecticides and fungicides.

Not much, perhaps, as tonnages go but no other use of Sulphur is more important with the possible exception of the 'wonder' drugs. It doesn't take much imagination to picture what would happen if the bugs and parasites were allowed to take over our crops and trees. Sulphur, along with other chemicals, is helping to protect our food supplies and foliage.

The role that TGS is playing in this constant fight against crop destruction is to see to it that the manufacturers of the insecticides and fungicides *always* have a ready supply of Sulphur, both solid and molten. This constant production and centralized distribution coupled with technical help is our contribution to industry.

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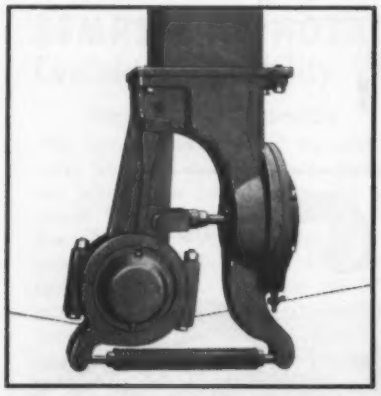
WITH PROVED BELOIT UNITS
...CUTS COSTS
...INCREASES SPEED
...IMPROVES QUALITY



Wires running off periodically?

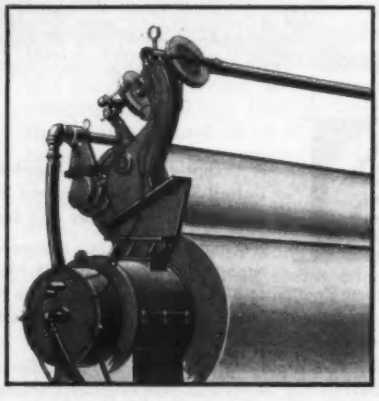
Obsolete wire guides can cut mercilessly into your paper-machine profits. Why not modernize with a low-cost Beloit automatic wire guide now? The patented Beloit air diaphragm guide moves the guide roll smoothly, efficiently. Its rate of response is independent of wire speed; wire edge damage is avoided through the use of a floating paddle. The entire mechanism is simple, foolproof, rugged—no small parts subject to easy damage. Models available for every type and size Fourdrinier.

Lumpbreaker roll problems?

A Beloit lumpbreaker roll can solve your problems. Beloit design supplies true loading with proper relationship to the couch suction box. Consider these important features:

- Air-diaphragm loading and lifting
- Remote control
- Motor driven
- Fully adjustable mountings
- Rugged body with thick, soft rubber cover

Mills report that the addition of a Beloit lumpbreaker roll results in marked improvement in machine efficiency and drying.



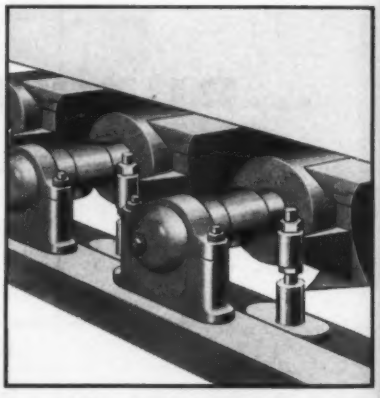
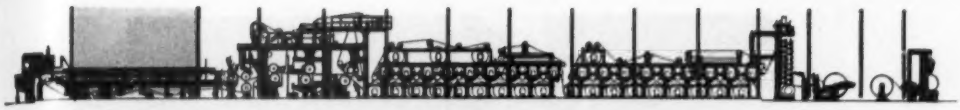


Table rolls bouncing?

Modernize with Beloit table rolls! Adequately sized precision balanced table rolls are a necessity if optimum sheet formation is to be achieved. Beloit gives full attention to detail: roll bodies are made to order, straightened, carefully machined, and balanced on precision equipment. Result: a table roll that will give outstanding performance. Beloit features table roll covers of micarta, rubber, composition, and brass—with special grooving available for reduced drainage rates.

BELOIT UNITS FOR FOURDRINIERS: SUCTION COUCH ROLLS • DANDY ROLL ASSEMBLIES
WIRE ROLL DOCTORS • WIRE TENSION ASSEMBLIES • STAINLESS STEEL
SAVEALLS • BREAST ROLLS • SHOWERS AND SQUIRTS



ONE OF A SERIES SHOWING TYPICAL BELOIT SOLUTIONS TO COMMON MILL PROBLEMS

tied to an OBSOLETE Fourdrinier?

Modernize your Fourdrinier with proved Beloit units. Here are components for the Fourdrinier section of your paper machine which have proved to be of special value in increasing speeds, improving paper qualities, reducing machine downtime, and cutting maintenance costs. Beloit also builds complete Fourdriniers of every type: stationary, cantilever, pit stringing removable, aisle stringing removable.

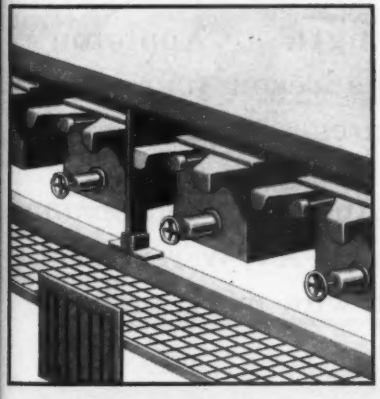
Let a Beloit sales engineer show you the best Fourdrinier design for your machine. Sheet quality improvements can be great —the cost small.

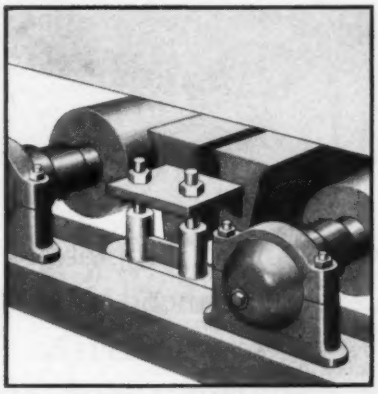
Suction boxes chattering?

Check these important features built into every new Beloit suction box:

- Stainless steel construction with effective reinforcing
- Internal construction that makes cleaning easy
- Full area discharge
- Box hangers for automatic height compensation
- Tried and proved suction box oscillators

A complete range of suction box covers is available.



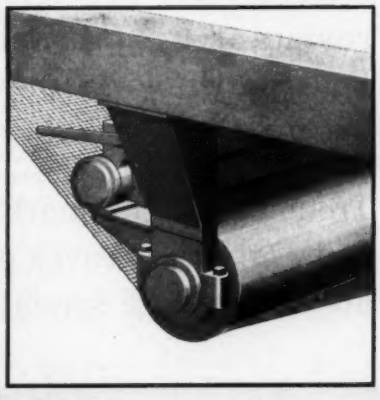


Wire drainage problems?

Beloit builds a complete line of forming boards and deflectors—designed to promote natural drainage and assure uniform formation. Forming boards are available in several types, incorporating convenient adjustments to permit accurate alignment with wire configuration. Single and multiple strip deflectors are available for specific application to every grade, speed, and machine width. Forming boards and deflector bodies are extra-heavy-duty stainless steel fabrications, especially machined to compensate for deflection.

Wire rolls thin and bouncing?

Wire rolls *must* be strong to reduce deflection—must have smooth surfaces for effective doctoring—must turn freely to avoid wire wear. Beloit-designed wire rolls with special antifriction bearings provide all three features. Newly designed bearing assemblies exclude water and retain grease more effectively than ever before.... Rugged Beloit wire rolls are available with rubber, monel, composition, or brass covers.



» **ACT!** *Write for facts —or ask a Beloit Sales Engineer. Beloit Iron Works, Beloit, Wis.*

BELOIT IRON WORKS · PAPER MACHINERY · BELOIT, WIS. U.S.A.

BELOIT
PAPER MACHINERY

your partner in papermaking

This is the business end of one of Appleton's 30 drawing machines. Through tungsten carbide and diamond dies, wire is drawn out with micrometric precision . . . to a hairlike fineness. The greater resistance to abrasion and the added strength of Appleton's Fourdrinier wires pay-off in profitable performance on *your* paper machine . . . another reason why Appleton wires are good wires.

Troubled by wire mark in your printing papers? Appleton's *Monoplane* and *Flatwarp* weaves may be your answer. Ask your AWW representative how these special wires can help solve your wire mark problem.

APPLETON WIRES ARE GOOD WIRES

Appleton Wire Works Inc. • Plants at Appleton, Wis. and Montgomery, Ala. • International Wire Works, Menasha, Wis.

TOM BIGBEE SAYS:

They're bleachin' and balin' at Naheola!

Marathon Southern's new mill at Naheola, Ala., has settled down to continuous production—they're bleachin' and balin' around the clock!

Rigid quality control—automatic and foolproof—keeps production going at top speed with unvarying excellence in the finished product. Naheola pulp—in either hardwood or softwood—is the finest the South has to offer.

All-modern bleaching facilities—now in full-time operation—put the clean, bright finishing touch to already excellent quality pulp.

The huge paper machines have been running continuously for several months. Everyone, including customers, is extremely pleased with results. With automatic instrumentation to guarantee product excellence, and good transportation facilities from Naheola to paper mills anywhere, America's paper industry is assured of service as needed, and can buy—confident of dependable quality and quantity on a continuing basis.

Yes, they're bleachin' and balin' at Naheola—just 170 water miles north of Mobile on the Tombigbee.

Ask Tom Bigbee about Naheola pulp samples. He'll send you a quantity for laboratory testing. Just write to Tom in care of the Pulp and Paper Department of Marathon in Menasha, Wisconsin.

MARATHON SOUTHERN CORPORATION
NAHEOLA, ALABAMA (P. O. Butler, Alabama) A subsidiary of

MARATHON
A Division of American Can Company
MENASHA, WISCONSIN

Marathon Southern completes most modern paper mill

A. W. J. DYCK

Among the highlights of this new integrated mill are a Beloit 196-in. paper machine, a Beloit Yankee tissue machine, a Sandy Hill 250-tons/day pulp machine, fully instrumented operations and well designed conveyor systems.

MARATHON SOUTHERN CORP.'S fully integrated $40,000,000 pulp and paper mill, located in western Alabama on the Tombigbee River, is one of the most modern and best engineered mills in existence. Its first operating units, i.e., barking, chipping, digesting, pulp drying, and tissue making facilities, went into production without a single failure of equipment in the late fall of 1958. Now the whole integrated mill, including paper making facilities on a 196-in. fourdrinier, is in full production. The mill produces bleached sulfate pulp, paper, lightweight paper board, towels, and tissue products. Paper and pulp sales are handled by Urban Krippene and Harold Skinner respectively. Both are located at Menasha, Wis.

Marathon Southern is an operating unit of Marathon Corp., now a division of American Can Company. Throughout its progressive history, Marathon Corp. has leaned heavily on scientific and engineering research. Accordingly, its well-planned expansions including many new processes are invariably implemented with characteristic precision and know-how, with the result that completely successful operation is assured from the beginning.

Assisting Marathon in the construction and engineering of this unique mill was J. E. Sirrine Co., who with its long and intimate association with the pulp and paper industry has been uniquely successful in selecting the right kind of equipment or machine for the right kind of performance or grades of manufactured products.

One of the reasons for the new mill's smooth start-up, which enabled it to produce market-quality paper and pulp from the beginning, is the emphasis by management on a strong instrument department to deal with the mill's highly instrumented operations. This department consists of a well qualified instrument supervisor, a number of instrument mechanics, and a well equipped instrument shop. In addition, all mill personnel is fully trained to have complete confidence in instruments and in instrument-controlled operations.

Among the construction design high-lights of this mill is the provision taken at every opportunity to plan for future expansion. Thus, a

John E. Spalding
Mill Manager

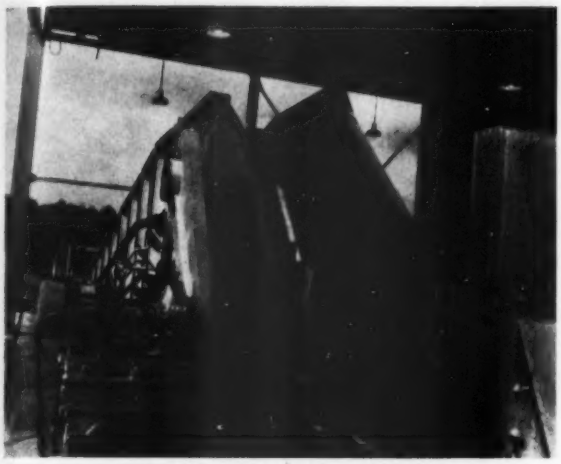
George Brabender
Assistant
Mill Manager

J. Vince Martin
Woodlands
Manager

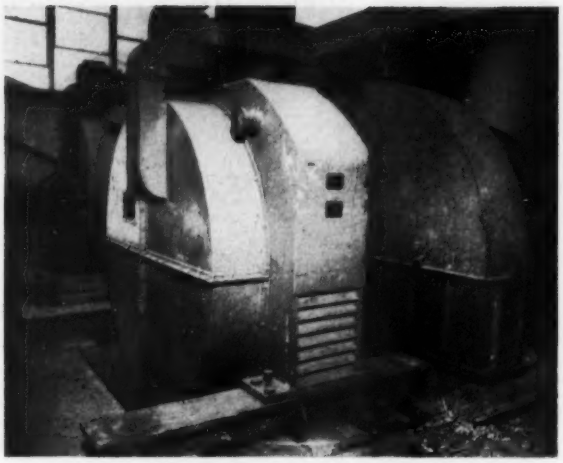
Hansell R. Wade
Pulp Mill
Superintendent

Robert S. Williams
Paper Mill
Superintendent

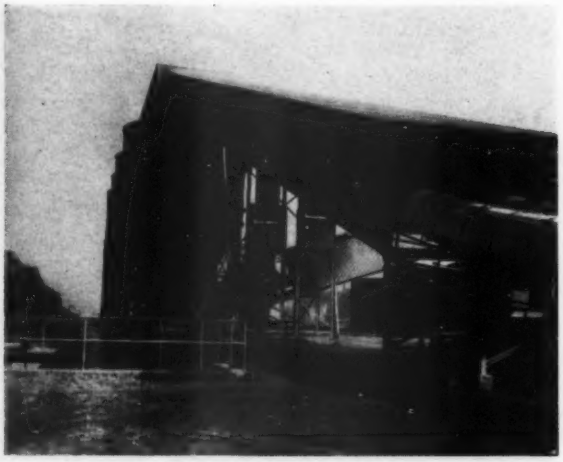
Rudolph C. Richter
Technical Services
Supervisor



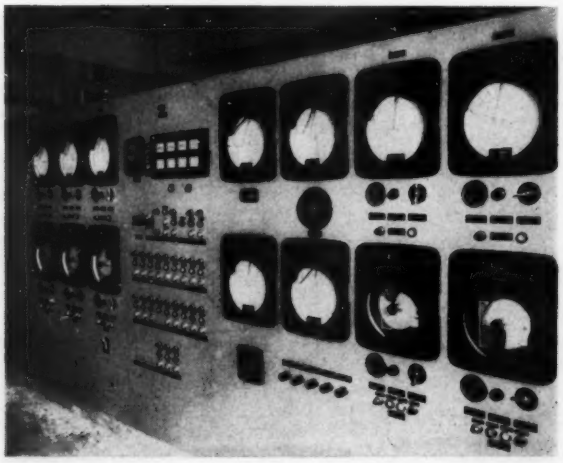
Montague conveyor conveys logs from Fiber-Making Processes barking drums to chippers.



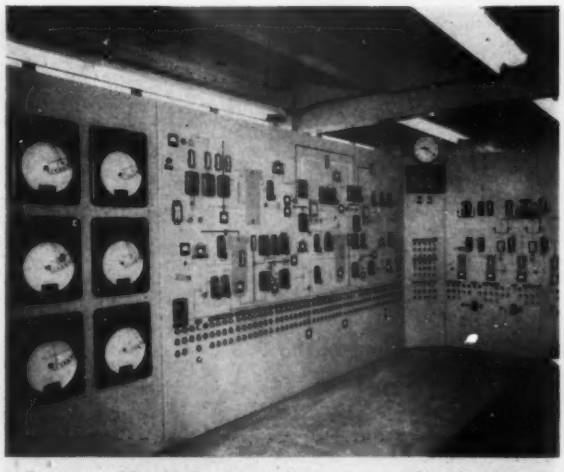
Murco and Carthage 104-in. chippers are driven by completely enclosed 1000-hp Marathon motors.



Montague chip conveying system to chip silos equipped with Stevens-Adamson plate feeders.

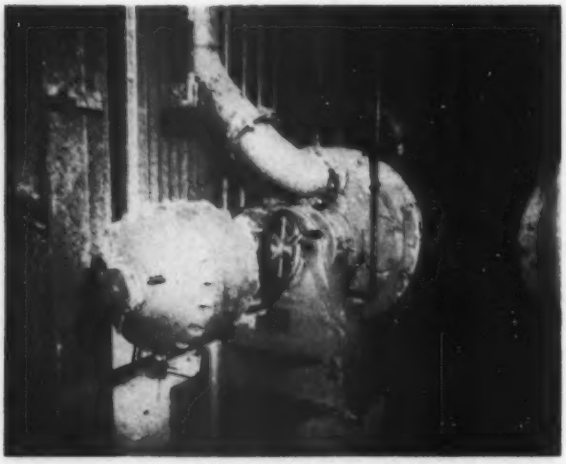


Foxboro 17-ft. instrument panel controls complete digester and brown stock washing operations.

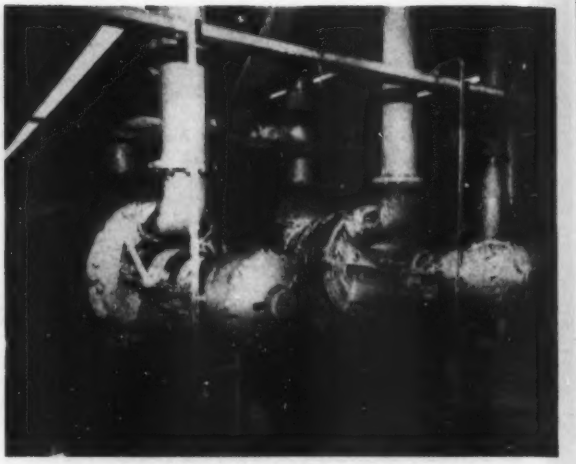


Bailey Meter bleach plant control system — said to be the most complete in existence.

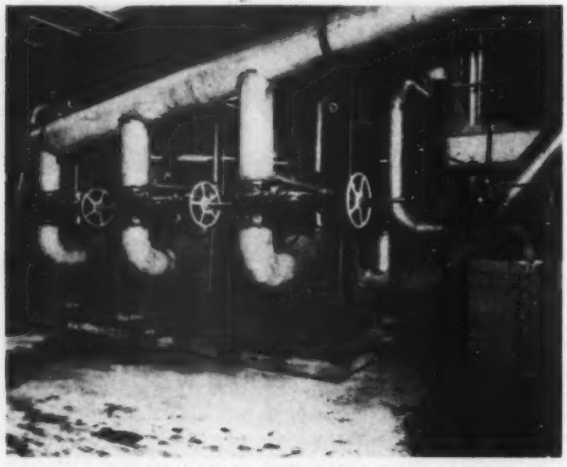
Impco 9½- × 16-ft. bleach plant washers, equipped with shredder, conveyor and double roll take-offs.



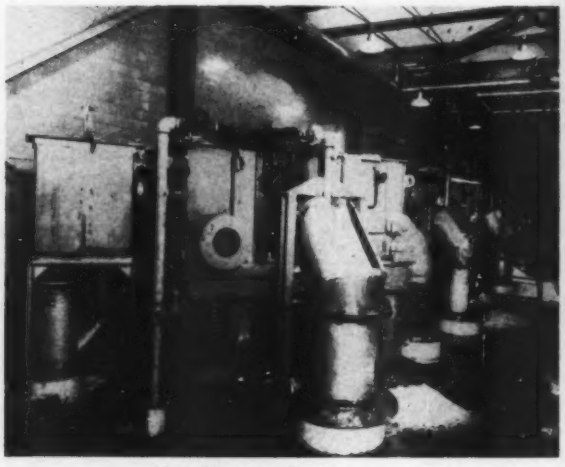
View of E. D. Jones Royal refiner.



View of Black-Clawson No. 6 Hydrafiners.

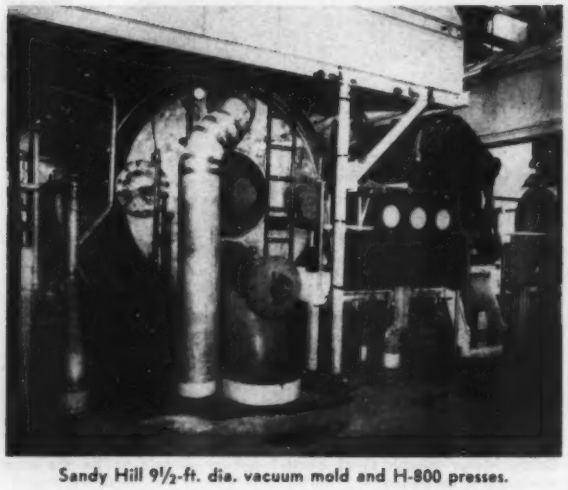


Bird Machine Vibrotor screens.

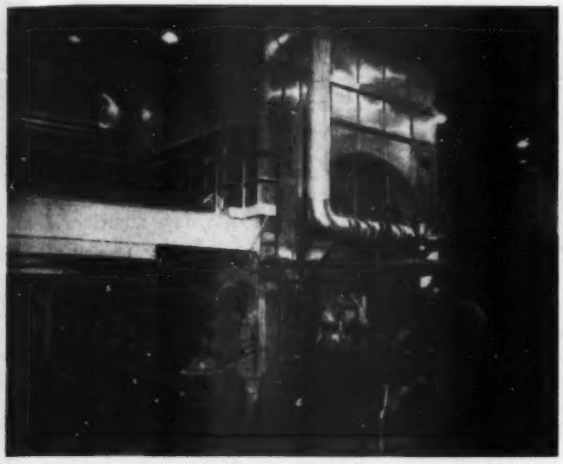


Black-Clawson selectifier screen.

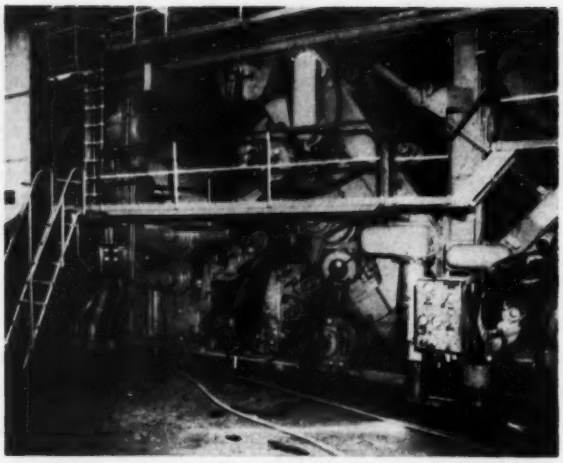
Bauer Bros. No. 623, 500 gpm Centri-cleaners.



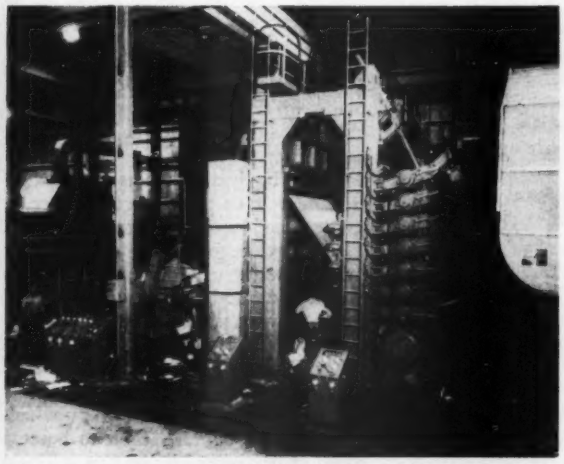
Sandy Hill 9½-ft. dia. vacuum mold and H-800 presses.



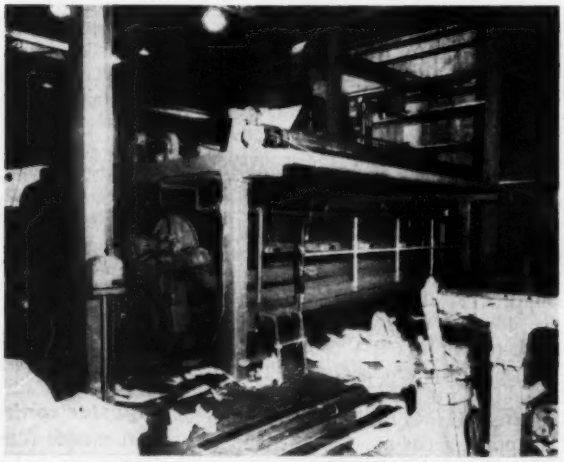
Beloit Yankee tissue machine featuring high-pressure 12-ft. dia. dryer operating at 160 psi pressure.



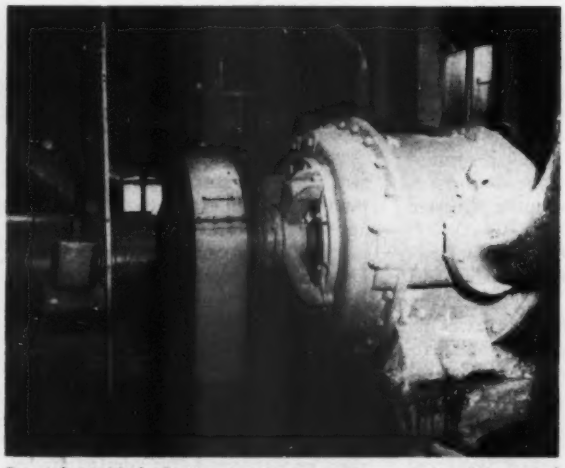
Beloit press section on No. 2 machine featuring special design suction rolls in diametric arrangement on main press.



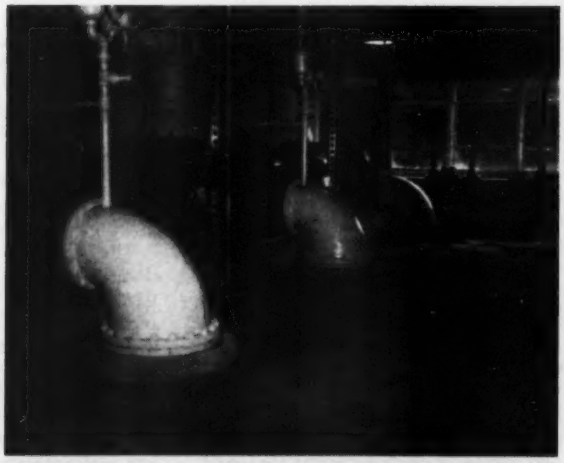
Beloit twin-type, open-sided 8-roll calender stacks; the first stack is equipped with water boxes.



Rice-Barton 190-in. trailing blade coater, followed by two Beloit 60-in. after dryers.



One of 14 Nash Engineering vacuum pumps serving No. 1 and No. 2 machines.



Three of Goulds water process pumps operating in connection with Graver clarifiers.

horizontal stretch of the coal conveying system to the power house is raised high enough to permit the addition of another power house when required, while all major buildings have, in addition to the three permanent walls, a temporary fourth wall that can be removed to permit expansion of the enclosed manufacturing area.

The mill will consume approximately 200,000 cords of pulpwood per annum. About 70 per cent of the pulpwood will consist of southern pine and 30 per cent of hardwoods such as gum, cotton wood, bay, magnolia, and willow.

Woodyard and chip preparation

Two crawler cranes and a Lorain crane are used to unload or feed logs into a 700-ft. long flume system equipped with bark and grit collectors. A 120-in. wide Model 45A traveling refuse screen is located at the 54-ft. deep flume water intake pit. The flume conveyor takes the logs to a two-strand jack ladder which feeds two 12 x 67 ½-ft. barking drums driven by two 150 hp and two 100 hp totally enclosed fan cooled induction motors.

Two single strand log conveyors take the logs from the barking drums to two 72-in. wide sorting belt conveyors capable of handling 50 cords of barked logs per hour. Two 30-in. wide feed belt conveyors supply the two chippers. Total power requirement for the log handling equipment from flume to chippers is 175 hp.

One of the chippers is a 104-in., 10-knife machine equipped with patented Uni-Chip knife mounting. The other, a 104-in., 12-knife chipper incorporating heliocoidal segments on the chipper disc, is equipped with a 24-in. spout and 27-in. long knives. Both are driven by 1000 hp synchronous motors. These motors are totally enclosed and forced ventillated with an integrally mounted blower and blower motor.

A 40-in., 6-knife rechipper equipped with stationary spout is used for rechipping of oversize chips.

The chips are conveyed by two 42-in. wide belt conveyors to three Model No. 72 Rotex chip screeners, operating in a nearly level gyratory motion for greater screening effectiveness. Each screen has a capacity of 36 units of chips per hour and is driven by a 10 hp motor.

Purchased chips are handled in a chip hopper, a two-strand drag conveyor, a 15-ton truck hoist, and a 42-in. belt conveyor to the chip screens.

The screened chips are conveyed by two 42-in. belt conveyors equipped with trippers to four 42 x 64-ft. chip silos equipped with 10-ft dia. rotary plate feeders and vibrators.

Two 42-in. wide belt conveyors with a capacity of 21,000 cu. ft./hr. carry the chips from the silos to the digester building where a 42-in. belt conveyor equipped with tripper supplies the five digesters.

Total power requirement for the chip handling system is 227 hp.

Chip digestion and brown stock washing

The five 4,700 cu. ft. capacity digesters — 12-ft. in diameter and 50-ft. long and featuring conispherical heads — are built of 2-in. thick carbon steel shells. Chips enter the digesters from the tripper through a spout that swings over and away from the digester. One of the digesters is equipped with digester charging units, blow valves, heat exchangers, digester circulation system, and blow heat recovery system. The digester circulation system includes 2,500 gpm pumps made of Alloy 40-S and patented lap joint strainers made of Alloy 45-S featuring cast screen plates for high corrosion resistance. The system also includes two-pass fixed tube sheet indirect heat exchangers made of Alloy 40-S.

The digested chips pass from the blow tank over a NRM 124 vibrating screen and then to a 16-ft. vibratory knotter containing three stainless steel baskets in a common vat.

From here it goes to three 9½ x 16-ft. dia. brown stock washers featuring double rotor intermediate repulpers.

Digester control system

A unique feature in digester operation is the control system arranged on a 17-ft. operators panel from which the complete operations of digesting and pulp washing are controlled. There are five separate control units, one for each digester. The control system is designed to improve digester circulation, reduce liquor pull-over to a minimum, make continuous correction for the plugging of relief screens, relieve excess pressure, provide a rate-of-rise-and-hold schedule as required for individual digesters, and record — on one chart — digester pressure and top and bottom digester cooking temperatures.

The instruments on the panel include 5 digester instruments, chip silo alarms, controls for weighing chips and regulating chip flow to each digester, steam flow recorders, condensate conductivity recorders, and recording controllers for black and white liquor.

On the washer side of the panel are hot water temperature and level recording controllers, consistency and conductivity recording controllers, and stock flow recording controllers to the washers. This panel also has blow tank level and density instruments and motor control pushbuttons for preknotters, agitators, stock pump, foam breaker, and various pumps.

Bleach plant

The 350 ton/day capacity bleach plant features a 5-stage bleach system as follows:

(1) Stock at 3.5-4 per cent consistency is chlorinated in a tile lined upflow chlorination tower and kept for 1 ½ hrs. in a rubber lined preretention tower. The chlorination stage is fully automatic using the continuous Black Widow automatic bleach control system.

(2) It is then extracted from 2½-3 hrs. in a down-flow, tile lined caustic extraction tower at 14 per cent consistency.

(3) The third stage is a hypo treatment in a down-flow tile lined tower at 14 per cent consistency.

(4) The chlorine dioxide treatment — at 5½ hours retention — takes place in a fire-brick lined up-flow chlorine dioxide tower at 14 per cent consistency.

(5) The final stage is a peroxide treatment at 14 per cent consistency in a tile lined up-flow peroxide tower. The peroxide solution is prepared by mixing water, Epsom salt solution, caustic soda, sodium silicate (prepared by dissolving silica glass in a high pressure autoclave with hot water and steam), and by hydrogen peroxide in a "Homomix" unit. The "Homomix" has four mixing zones each of which has a mixing unit attached to a common shaft powered by an electric motor. The chemicals are metered into the "Homomix" by 4 controlled volume pumps.

Bleach tower equipment includes a chlorine mixer; four double-shaft and two single-shaft steam mixers with automatic opening and closing steam nozzles; automatic dilution nozzles for the two downflow high density towers; circulation pumps; two air pressure feeders; and two radial flow mixers.

A novel arrangement is the use of two air pressure feeders instead of pumps to feed stock to the peroxide and chlorine dioxide towers, and the use of a gama gauge to maintain stock levels in the towers. Another notable feature is the use of liquid sulfur dioxide for the Mathieson chlorine dioxide generating process. The ClO_2 process equipment includes a 3,300 gal. Glasteel primary generator (featuring pressure relief vent of 24-in. dia. preset to release at ½ psi pressure, unplasticized PVC draft tubes of 16-in. dia. with aluminum oxide dif-

George Smits
Converting
Superintendent

James R. Kocha
Plant Engineer

Donald Hesselman
Prod. Services
Supervisor

Emmett Conn
Field Superintendent-Woodlands

David L. Hughes
Purchasing Agent

John E. Jungkind
Public Relations
Representative

fusion discs for introduction of the SO_2-air mixture. There is also a 15,000 gal. Glasteel tank for ClO_2 storage and a 5,000 gal. Glasteel tank for waste liquor.

Following each bleaching stage there is a 9½ × 16.-ft. vacuum bleach washer equipped with shredder, conveyor and double roll take-offs. The vacuum bleach washer following the chlorine dioxide bleaching stage is made of stainless steel. There are also five pH samplers for the high density bleaching stages.

While pulp is currently bleached to 85 per cent brightness, a 90-92 per cent brightness pulp can be produced without difficulty.

Bleached pulp is stored in four tile lined high density storage tanks, of 128 tons capacity each and provided with dilution equipment at the bottom.

Bleach plant control system

All bleaching operations are controlled from a most completely instrumented central control room. Full credit was given by the bleach plant superintendent for excellent performance of the bleach control system.

The instrument and control panel boards are divided into the recorder section and the functional graphic section, the latter providing a complete visual picture of the entire process. In the recorder section, continuous circular chart records are provided on all bleach plant variables. The most important controlled variables include stock consistency, stock flow, bleaching liquor flows, stock temperatures, and manual dilution water flow.

Each of the vacuum bleach washers is controlled from a desk type console provided with automatic washer vat level control, which is a relatively new innovation in the bleaching process.

The control room also contains a high-density bleached stock control panel from which the operator can automatically supply consistency-controlled stock in any desired ratio from any of the four high-density storage towers to any of the semi-bleach, pine bleach, or gum bleach pulp chests in the paper machine room.

Chemical recovery

Black liquor is evaporated in a six-body, sextuple-effect evaporator system equipped with surface and barometric condensers, and capable of evaporating 378,000 lb./hr. of 15 per cent solids liquor to a liquor containing 53 per cent solids. The evaporators, with the exception of the sixth effect, are equipped with internal heaters, which is a new development in evaporator design. The first and second effect evaporators are of stainless steel construction.

Final evaporation of black liquor is achieved in a Venturi scrubber and cyclone evaporator equipped with automatic Venturi scrubber black liquor flow control.

Concentrated black liquor from the Venturi evaporator is sprayed through a nozzle into a recovery boiler capable of producing 181,000 lb. of steam per hour.

Black liquor flow into the furnace is automatically controlled. Automatic combustion control in the furnace is accomplished by (1) black liquor-total air ratio control, (2) total air-primary air ratio control, (3) tertiary air control, and (4) furnace draft control.

Oil may be fired with automatic oil flow-air flow ratio control when black liquor is not being burned. An oxygen and combustibles analyzer is used as a guide to proper combustion conditions.

The continuous recausticizing operation employs the comparatively new two-stage slaking system which uses a primary slaker in combination with a large slaker. The equipment in this system includes: a No. 10 caustic type lime slaker; a 16-ft. dia. × 16-ft. APA primary slaker; three No. 12 causticizer mechanisms; a 40-ft. dia. × 14-ft. ATB white liquor clarifier; a 40-ft. dia. × 14-ft. ATH 2-stage lime mud washer; a 20-ft. dia. × 20-ft. AP lime mud washer; a 6-ft. dia. × 8-ft. face 14FIC lime mud washer and auxiliaries; a 40-ft. dia. × 24-ft. ATO green liquor clarifier; a 24-ft. dia. × 24-ft. ATO dregs washer; five No. 6W Duplex suction pumps; three No. 2VM pumps; ten miscellaneous system pumps; and the necessary tanks, trays, instruments and control panels.

Lime mud is burned in a 9-ft. dia., 250-ft. long kiln equipped with dust collector and scrubber.

The lime handling conveying system includes 15 tons/hr. unloading conveyors, 5 tons/hr. returned lime handling conveyors, hopper and bucket elevators.

Feltless wet machine

The feltless wet machine rated at 250 tons/day capacity produces pulp at 50 per cent consistency and well in excess of rated capacity.

The wet machine consists of a vacuum mold, two H-800 presses, two pre-dryers, and a Flakt dryer. The machines are driven by two 500 hp., 3-phase, 60 cycle synchronous motors featuring three-bearing construction for chain drives.

Pulp stock is pumped through the stuff box and consistency regulator to 3 Vibrotor screens, capable of high capacity, slotted plate cleaning, and then to a No. 623-4, 650 gpm primary centricleaner and a No. 667, 90 gpm secondary centricleaner. From here it goes to the 9½-ft. dia., 156-in. face vacuum mold. The mold is of stainless steel construction, of exclusive "hard-deck" design, and equipped with two rubber covered grooved press rolls and one couch roll.

The latest design presses are equipped with adjustable water doctors, anti-friction bearings on press rolls with transparent covers for visual inspection of the bearings, enclosed elbow gears and a new draw control device. The first press is designed for nip pressures up to 188 lb./lin. inch and the second press up to 2800 lb./lin. inch.

The pre-dryers, consisting of two 4-ft. dia. dryers, are located between the first and second presses.

Principal equipment installed at Marathon Corp.'s Naheola mill

Engineering and Construction: J. E. Sirrine Co.

Wood preparation

Barking drums (2), 12 × 67½ ft. ..... Fibre Making Processes Inc.
Bark and grit collectors, 700 cords/24 hrs. capacity ..... Link-Belt Co.
Chipper, Murco, 104-in. disc, 24-in. spout, 10-knife, driven by 1000 hp motor ..... D. J. Murray Mfg. Co.
Chipper, 104-in. disc, 24-in. spout, 12-knife, driven by 1000 hp motor ..... Carthage Machine Co.
Chip screens (3), No. 72 Rotex ..... Orville Simpson Co.
Chip silos (4), 42 × 64 ft. ..... Rothschild Boiler and Tank Works
Conveyor belts ..... U. S. Rubber Company
Conveying systems, for logs, bark, chips and purchased chips ..... B. L. Montague Co., Inc.
Cranes (2), crawler-type ..... Harnischfeger Corp.
Flume conveyor, 3 × 700 ft. ..... Ingalls Ironworks
Motors, electric, including two 1000 hp on chippers; two 150 hp and two 100 hp on barking drums ..... Marathon Electric Mfg. Co.
Plate feeders, 10 ft. dia., rotary ..... Stevens-Adamson Manufacturing Co.
Rechipper, 40-in. disc, 6-knife, with stationary spout ..... D. J. Murray Mfg. Co.
Splitter, Murco hydraulic ..... D. J. Murray Mfg. Co.
Traveling refuse screen, 120 in. wide, Model 45A ..... Link-Belt Co.

Digesters

Blow heat recovery system ..... Rosenblad Corp.
Blow tank ..... Rothschild Boiler and Tank Works
Blow tank agitator ..... Improved Machinery Inc.
Blow valves (5) ..... Paul Valve Corp.
Digesters (5), 12 ft. × 50 ft. - 4700 cu. ft. capacity ..... Chicago Bridge & Iron Co.
Digester charging units, including air cylinders ..... Dixie Steel & Supply Co.
Digester control system, 17-foot operator's panel, also controlling brown stock washing ..... Foxboro Co.
Esco alloy on digester pumps, lap joint strainers, heat exchangers ..... Electric Steel Foundry Co.
Heat exchangers (3) ..... Rosenblad Corp.
Heat exchanger (1) ..... Patterson-Kelley Co., Inc.
Motors, electric ..... Marathon Electric Mfg. Co.
Pulp filters ..... Rosenblad Corp.
Pumps, water and seal, 120-3500 gpm ..... Ingersoll-Rand Co.
Stock pumps (2), 1700 gpm ..... Crane Engineering Sales Co.
Turpentine condenser and decanter ..... Rosenblad Corp.
Vibrating screen, NRM 124, handles digested chips and knots rejects ..... Link-Belt Co.

Pulp washing and screening

Air system, including brown stock washer, washer hoods and digester hoods ..... Industrial Air Co.
Brown stock washers (3), 9½ × 16 ft. with double rotors, intermediate repulpers ..... Improved Machinery Inc.
Centrifugal screens (3), with Conoflow operators ..... Improved Machinery Inc.
Consistency regulators ..... DeZurik Corp.
Console cabinets on brown stock washers and screens .... Foxboro Co.
Decker, valveless, 11½-ft. dia. × 18-ft. face, equipped with conveyor repulper and drive; 650-sq. ft. filtering area; with 6 overhead brass wash pipes and Nycoe nozzles .... Dorr-Oliver Inc.
Foam breaker, mechanical ..... Improved Machinery Inc.
Foam tank, 20 × 60 ft. ..... Rothschild Boiler & Tank Works
Liquor filtrate tanks ..... Rothschild Boiler & Tank Works
Motors, electric ..... Marathon Electric Mfg. Co.
Pre-refiner ..... E. D. Jones & Sons Co.
Screen rejects refiner ..... Sprout, Waldron & Co. Inc.
Centri-cleaners ..... Bauer Brothers Co.
Washed stock chests, 17 × 50 × 18 ft. Kalamazoo Tank & Silo Co.
Vibratory knotter, containing three stainless steel baskets in a common vat ..... Improved Machinery Inc.

Chemical recovery

Evaporators (6), six-body, sextuple-effect, 378,000 lb./hr., equipped with internal heaters ..... Swenson Evaporator Co.
Evaporator control and instrumentation ..... Foxboro Co.
Kiln, 9 ft. dia., 250 ft. long, equipped with dust collector and Peabody scrubber ..... Traylor Engr. & Mfg. Co.
Lime slaker, No. 5 ..... Dorr-Oliver Inc.
Lime handling system, including 15 tons/hr. unloading conveyors, 5 tons/hr. reburned lime conveyors, elevators, hoppers, etc. ..... Jervis B. Webb Co. of Ga.
Recovery boiler, 181,000 lb. of steam/hr., equipped with Venturi-evaporator scrubber ..... Babcock and Wilcox Co.
Recausticizing system, consisting of primary slaker, secondary slaker, white liquor clarifier, mud washer, green liquor clarifier, dregs washer, lime storage bin, pumps, trays, instruments and control panels ..... Dorr-Oliver Inc.
Recovery boiler automatic combustion control, etc. .. Bailey Meter Co.
Screw conveyors three 9 in. dia. for handling fresh lime and one 6 in. dia. for feeding bleached lime to slaker ..... Link-Belt Co.
Soap pumps ..... Viking Pump Co.

Bleach system

Automators (10), variable speed drives, on air pressure feeders and washers; including motor generator set, ac and dc controls, static exciter —all assembled in a forced ventilated enclosure equipped with air filters ..... Marathon Electric Mfg. Co.
Bleach instrumentation ..... Foxboro Co.
Bleach Control System ..... Bailey Meter Co.
Bleach Towers (5) ..... Rothschild Boiler & Tank Works
Bleach tower equipment, including chlorine mixer, steam mixers, automatic dilution nozzles, circulation pumps, air pressure feeders and radial flow mixers ..... Sandy Hill Iron & Brass Works
Bleach washers (5), 9½ × 16 ft., equipped with shredders, conveyors and double roll take offs ..... Improved Machinery Inc.
Chlorine bleach control, "Black Widow" system, automatic ..... Allegany Instrument Co. Inc.
Chlorine dioxide radial flow mixer ..... Sandy Hill Iron & Brass Works
Chlorine vaporizers ..... Richard M. Armstrong
Consistency indicators ..... Taylor Instrument Co.
Controlled volume pumps, for metering chemicals for peroxide make-up ..... Milton Roy Co.
Glasteel equipment, including 3300-gal. ClO_2 generator, and storage tanks ..... Pfaudler Co.
High density storage tanks (tile-lined), one 17 × 60 ft., and four 30 × 60 ft. ..... Kalamazoo Tank & Silo Co.
Homomix, hydrogen peroxide mixer, with four mixing zones and mixing units ..... American Well Works
Kamyr air pressure feeder ..... Sandy Hill Iron & Brass Works
Oscillating conveyor, 18 in. × 4 in., Flexmount, including No. 774 continuous discharge elevator system for handling silicate glass ..... Link-Belt Co.
Seal tanks (5), stainless steel ..... Rothschild Boiler & Tank Works
Washer vats, tile-lined ..... Kalamazoo Tank & Silo Co.

Kamyr wet machine

Centri-cleaners (2), one No. 623-4, 650 gpm, ane one No. 607, 90 gpm ..... Bauer Bros. Co.
Cutter ..... Lamb-Grays Harber Co. Inc.
Flakt dryer, 240-ton capacity ..... American SF Products Inc.
Kamyr wet machine, consisting of a 9½-ft. dia. vacuum mold, two H-800 presses, and two pre-dryers ..... Sandy Hill Iron & Brass Works
Layboy ..... Mathews Conveyor Co.
Motors, electric ..... Marathon Electric Mfg. Co.
Vibrotor screens, for high capacity, slotted - plate cleaning ..... Bird Machine Co.

Paper machine room

Air system, paper machine heads, mill ventilation, felt drying, etc. ..... Industrial Air Co.
Calender stacks, twin type, open-sided ..... Beloit Iron Works
Calender stack on Yankee tissue machine, two sets Farraloy rolls ..... Beloit Iron Works
Centri-cleaners (20, 18 No. 623, 500 gpm and two No. 606, 90 gpm ..... Bauer Bros. Co.
Crepe dryer, 8 ft. dia. ..... Beloit Iron Works
Dryer section on No. 2 machine, 34 60-in. dryers designed for 125 psi pressure ..... Beloit Iron Works
Fan pumps ..... Goulds Pumps Inc.
Headbox on No. 2 machine, air-cushioned inlet .... Beloit Iron Works
Headbox on Yankee tissue machine, air-cushioned inlet ..... Beloit Iron Works

HyTac section drives (6), 20 hp and 35 hp ..... Oilgear Company
Hydrafiners, No. 6 ..... Black-Clawson Co.
Jordans, Miami No. 6 ..... Black-Clawson Co.
Motors, electric, including 6 on refiners and jordans, 350-hp, synchronous ..... Marathon Electric Mfg. Co.
Paper machine No. 2, 2000 fpm, 192-in. wire ..... Beloit Iron Works
Paper machine drive, differential ..... Beloit Iron Works
Paper machine lubrication system, roll filter lubrication system ..... Beloit Iron Works
Press section on No. 2 machine, consisting of pick-up, main and third presses ..... Beloit Iron Works
Press section on tissue machine, straight through rubber-covered suction press arrangement ..... Beloit Iron Works
Reel, pneumatic ..... Beloit Iron Works
Refiners, Royal ..... E. D. Jones & Sons Co.
Selectifier screens ..... Black-Clawson Co.
Trailing blade coater, equipped with Gardner dryer ..... Rice-Barton Corp.
Trailing blade coater after-dryers (2), 60-in. dia., with pull-roll stack ..... Beloit Iron Works
Vacuum pumps (14), seven on No. 2 machine, five on No. 1 machine, one on Ross Midwest drainage system and one on Dorr-Oliver filter ..... Nash Engineering Co.
Vacuum savealls (2), 9-ft. dia. × 7 disc-type, equipped with drive, speed reducers, Conoflow control and Actuators of stainless steel and rubber-covered construction ..... Dorr-Oliver Inc.
Vertical size press ..... Beloit Iron Works
Vickery felt conditioners, latest design, hydraulically-driven and of traveling header design; each equipped with four jordan type conditioning boxes ..... Bird Machine Co.
Winder, Model "L", 5000 fpm, with motor-driven sectional rider roll, conveyor-type roll stripper and shaft handling equipment ..... Beloit Iron Works
Yankee dryer, high-pressure, 12-ft. dia., with high-speed condensate removers and three doctors ..... Beloit Iron Works
Yankee tissue machine, 2500 fpm, 192-in. wire .... Beloit Iron Works
Yankee tissue machine drive, sectional electric .... Reliance Electric & Engr. Co.

Steam and power generation

Ash handling system ..... Allen-Sherman-Hoff Co.
Boiler feedwater chemical pumps ..... Hills-McCanna Co.
Boiler feedwater pumps (3), 4 × 6 × 9½, 9-stage, type DVMX, each 300,000 lbs/hr. capacity ..... Byron Jackson Pumps Div.
Coal handling system, including track hoppers, plate feeder, three 24-in. belt conveyors, coal crusher, one 20-in. distributing screw conveyor, etc. ..... B. L. Montague Co. Inc.
Condenser, dual bank, two-pass, 15,000-sq. ft., serving the turbine-generator ..... C. H. Wheeler Mfg. Co.
Motors, electric, including two 600-hp on feed water pumps, one 300-hp and one 250-hp on draft fans ..... Marathon Electric Mfg. Co.
Power boiler, 300,000 lb of steam/hr., designed for simultaneous bark and coal firing ..... Riley Stoker Corp.
Power boiler combustion control, feed water and temperature control, etc. ..... Bailey Meter Co.
Pumps, for fuel oil unloading, transfer and circulation ..... Warren Pumps Inc.
Turbo-generator, 22,000 KVA, 850 psi pressure at 825° F ..... General Electric Co.

Water supply

Boiler feedwater make-up system, including cation and anion units, automatic control panel and regenerating system ..... Cochrane Corp.
Clarifiers (2), Reactivators, 120 ft. dia. ..... Graver Water Conditioning Co.
Chlorinators ..... Wallace & Tiernan Inc.
Pumps, river, back washing, process and mill service ..... Goulds Pumps Inc.
Raw water pumps ..... Peerless Pump Co.
Sand filters, gravity-type ..... Graver Water Conditioning Co.
Water storage tank, 2½ million gallons .... Rothschild Boiler & Tank Works

From the second press the pulp sheet enters the 240-ton capacity Flakt dryer where it makes 11 horizontal passes over a total distance of 1100-ft. At the end of the dryer is a layboy cutter and a pulp sheet conveyor.

No. 1 tissue machine

Stock from the high density towers is pumped to a tile-lined dump chest, and then through consistency regulators to a proportioner which blends pine with hardwood stocks. Prior to entering the proportioner, pine stock is refined in a Royal refiner driven by a 250 hp motor.

The blended stock passes from the proportioner through a No. 6 Hydrafiner driven by a 350 hp motor to the machine stock chest. It is then pumped through a Miami No. 6 jordan, a consistency regulator, two selectifier screens, 10 Centri-cleaners (8 primaries No. 623 of 500 gpm capacity, one secondary No. 623 of 500 gpm capacity, and one tertiary No. 606 of 90 gpm capacity) to the 15,000 gpm fan pump supplying the 192-in. Yankee tissue machine.

The 2,500 fpm machine has a stainless steel clad pressurized headbox featuring a 5-roll type air-cushioned inlet. Pressure to the headbox is supplied by an L-3 compressor.

The fourdrinier has a 192-in. wire equipped with constant tension type wire stretcher, a centrifugally cast bronze breast roll, a stainless steel forming board equipped with micarta lips, Dandy type table rolls mounted in anti-friction bearings, three stainless steel suction boxes carried in stationary mountings, automatic air activated wire guide, wire rolls one of which is located ahead of the couch and the others in the return wir run, bottom and top couch rolls, and stainless steel saveralls extending from breast roll to the last suction box. White water from the pit is pumped to a 100 tons/day, 9-ft. dia. disc vacuum saveall equipped with drive, speed reducer, Conoflow control and Activators of 316 stainless steel and rubber covered construction. The unit is complete with headbox, conveyor-repulper, reducer and couplings.

The press section is a straight through rubber covered suction press arrangement, with the suction pressure rolls mounted in heavy swing arms with diaphragm type loading. Each suction roll is equipped with silencer in addition to featuring the latest silent pattern of drilled holes.

The press felt is equipped with a latest model hydraulically driven Vickery felt conditioner of the traveling header design and four jordan type conditioning boxes.

Vacuum to the press section, etc. is provided by two H-11T vacuum pumps to the suction roll of the first press, an L-11A vacuum pump to the suction roll of the second press and felt conditioner, a K-6 pump on the suction felt box, and a K-7 pump on the wire boxes.

The high pressure Yankee dryer is 12-ft. in diameter and operates at 160 psi working pressure. It is equipped with a high speed condensate removal system, arranged for condensate evacuation at two positions. It is further equipped with 3 doctors, i.e., a skinning doctor, a creping doctor, and a cleaning doctor.

The calender section consists of two sets of Farraloy rolls for downward vertical sheet run. It features diaphragm type loading and air cylinder operated doctors for each roll.

Following the calender section, there is a special motor-driven slitter and a tissue type reel.

No. 2 paper machine

The stock flow, refining, and blending operations are identical with those of No. 1 machine, with the exception that there are two No. 6 Hydrafiners and two Miami No. 6 jordans.

The stainless steel-clad headbox of the 2000 fpm No. 2 machine features an air-cushioned inlet of the 5-roll type.

The removable type fourdrinier carrying a 192-in. wire has a centrifugally cast breast roll, stainless steel forming board with micarta lips, rubber covered table rolls of aluminum tube construction, deflectors carried on non-shaking rails, 6 stainless steel suction boxes carried in oscillating mountings, an automatic air activated type wire guide, rubber covered rolls located in return wire run, a driven Dandy roll of open construction and trunnion mounted, a constant tension type wire stretcher, stainless steel savealls extending from breast roll to the last suction box, a rubber covered lumpbreaker roll provided with automatic air lift, and a centrifugally cast bronze suction couch roll with air loaded packing.

The press section consists of a brass suction pick-up press, a main press, and the third press. The main press is a special design incline type with two rubber covered suction rolls in diametric arrangement with a hard rubber covered plain press roll. The plain rubber covered third press is a straight through press arranged with double diaphragm loading. Hydraulically driven Vickery felt conditioners of the traveling header design each equipped with four jordan type conditioning boxes keep the three felts and bottom carrying felts clean and open.

The vacuum system on the suction rolls and suction boxes includes an H-11A and an H-12A vacuum pumps serving the wire boxes, an H-11A pump on the suction pick-up roll, an H-12A pump on the first press, an L-11A pump on the second press, and a K-9 pump on the suction wringer roll.

The dryer section, containing thirty-four 60-in. dryers for operation at 125 psi pressure, is divided into three parts. The back frames of the dryer section are designed to completely enclose driving gears. All dryers are equipped with dipper type condensate removers and duplex steam fits.

There is an 8-ft. dia. crepe dryer, equipped with a creping and a cleaning doctor, located between the first and second sections, while a vertical size press separates the second and third dryer sections.

The first of the twin-type open sided 8-roll calender stacks equipped with water boxes serves as a breaker stack.

A pneumatic machine reel located after the second calender stack can be by-passed or used depending on whether the paper run is coated or not.

The trailing blade 190-in. coater is equipped with a Gardner air dryer and two 60-in. after dryers followed by a pull roll stack.

Following the coater there are two special motor driven slitters and a pneumatic coater reel equipped with reel spool starter.

The unwind stand following the reel is a heavy duty type equipped with water cooled brake and with manual or automatic tru-tension control arrangement.

A model "L" winder equipped with motor driven sectional rider roll, conveyor type roll stripper and shaft handling equipment completes the paper processing installation of No. 2 machine. The winder is designed for speeds up to 5000 fpm.

The machine is driven, to give perfect draw and speed control, by a differential drive system incorporating three 20 hp and three 35 hp Hytac section drives. A steam turbine is the prime mover of this system.

Steam and power generation

In addition to the 181,000 lb. of steam/hr. recovery boiler described under chemical recovery, there is a bark and coal burning boiler designed to generate 300,000 lb. of steam per hour at 875 psi pressure and 825° F.

The boiler is designed to utilize unhogged bark directly as received from the barking drums. Coal is used to supplement the bark.

The fuel burning equipment consists of a twin-gate spreader stoker (each of the twin gates being operated by its own hydraulic drive), 26-ft. wide and 22-ft. long, with front ash discharge and designed to handle bark and coal simultaneously. Bark is fed though a rotary bark proportioner — the largest of its kind — and distributed onto the stoker grate by six pneumatic distributors. Coal is fed through six mechanical coal spreaders.

The steam generator and heat recovery system consists of a water-cooled furnace, multi-pass boiler, economizer, and air-heater. A forced draft fan and induced draft fan driven by 300 and 250 hp drip-proof induction motors provide the combustion air and furnace suction. A dust collector, located between the economizer and air heater, traps fly ash which is pneumatically returned to the furnace after passing through a sand separator so that only fly ash with a high carbon fraction is refired in the furnace.

The steam fed to the turbo-generator is held at constant temperature by mixing desuperheated steam with low temperature superheated steam before the mixture enters the high temperature superheater.

The complete steam generating unit is on automatic control with optional manual adjustment. Coal feed, air flow, steam flow and steam temperature are automatically regulated to hold desired values. The forced fan damper is regulated to suit firing requirements, while the induced draft fan damper regulation is set to hold the constant furnace draft. An oxygen analyzer is used as a guide to proper combustion.

Feed water to the boiler is provided by three 4 × 6 × 9H, 9-stage, type DVMX pumps rated at 650 gpm at a discharge pressure of 1100 psi and pumping temperature of 298° F. The two main pumps are driven by 600 hp drip-proof squirrel cage induction motors, while the third pump is driven by an El 20 steam turbine. The pumps incorporate the features of a double suction first stage, back-to-back impellers for axial balance and the double volute for radial balance.

Electric power is supplied by a 22,000 KVA hydrogen cooled turbine-generator using initial steam pressure of 850 psi at 825° F. Its final exhaust pressure is 2-in. Hg.

The turbine generator is served by a 15,000 sq. ft. dual bank, two-pass, divided water box condenser which has a condensing capacity of 80,000 lb. of steam per hour at a back pressure of 2.06-in. Hg.

A twin-element air ejector, consisting of two first and two second stages, removes non-condensable gases from the condenser. The two stages are connected with manifold valves so that any primary stage can be used with any secondary stage or any one stage can be cut out of service.

Condensate from the condenser is removed by two 6-in. × 3-in., 225 gpm, horizontally split case, double suction pumps.

Water supply

Water is pumped from the Tombigbee River by 3 river pumps into two 120-ft. dia. × 18½-ft. high Reactivators. The pumps have a combined capacity of 25,000,000 gal. per day. The Reactivators or clarifiers have a capacity of 25 million gal. per day and guarantee an effluent of 5 ppm of turbidity or less.

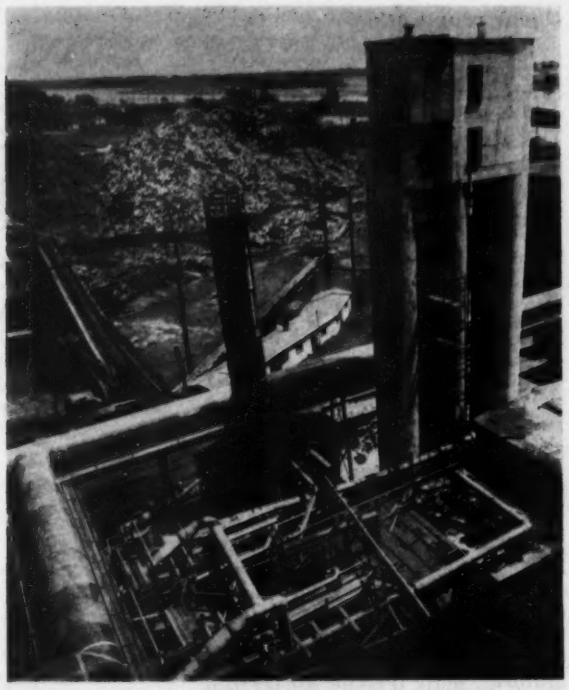
From the clarifiers, water is pumped through 6 filter beds to the clearwell. Three process pumps then pump it into a 2.5 million gal. reservoir from which three mill service pumps pump it to the mill.

Boiler feedwater makeup is treated in a push-button automatic demineralizer designed for a maximum continuous capacity of 350 gpm. Water

(Continued on page 674)

Magnefite pulping process has many advantages

DAVE COSLETT
Dow Chemical Co.



Lower left shows two venturis through which liquor is recycled and mixed with SO_2.

▶ Among the advantages of the magnefite process are low heat and chemical losses and the use of a wide variety of wood species.

A NEW MAGNESIUM base sulfite pulping process, recently tested at Howard Smith Paper Mills Ltd. (Cornwall, Ont. div.), promises to add several important processing advantages and economies to sulfite pulping operations.

The new process, essentially a modification of liquor make-up and cooking steps used in established magnesium base pulping, is called the magnefite process, taking its name from the chemical compound magnesium bisulfite. The magnefite process differs from the conventional acid sulfite process in that it employs a liquor containing essentially magnesium bisulfite instead of one containing a large excess of free sulfurous acid.

Experimental work that became the heart of the widely-used magnesium base sulfite process was also done by Howard Smith. In about 1936 G. H. Tomlinson of Howard Smith discovered that a very simple and efficient recovery system was possible if magnesium rather than calcium were used as a base for sulfite pulping. Later, Howard Smith joined with Weyerhaeuser Timber Co. and Babcock & Wilcox Co. to perfect the magesium base recovery system.

This earlier magnesium process has found wide use, since by offering simple and efficient recovery it solves the serious pollution problem that has plagued many sulfite mills.

Pollution, however, has not been a serious problem for the sulfite mill—oldest in operation in Canada—that Howard Smith operates at its Cornwall Div. Far more important has been the diminishing supply of suitable wood species, primarily spruce and balsam, within a convenient radius of the Cornwall plant. Howard Smith also operates an alkaline mill at Cornwall, and company officials were seriously considering changing completely to alkaline pulping.

Advantages of the magnefite process

Magnefite, on which Howard Smith has applied for patents, resulted when the firm's research department, headed by Dr. G. H. Tomlinson II, decided to take one more look at sulfite pulping. One of the chief advantages of the new process to Howard Smith is the fact that, as Dr Tomlinson puts it, "there is practically no limit to wood species—hard wood or soft wood—that can be used."

In a recent paper presented before the annual meeting of the Technical Section, Canadian Pulp & Paper Association,* Howard Smith officials claim that the simplicity of the combined cooking and recovery operation in magnefite will result in major savings of capital, maintenance and operating costs with the following advantages:

1. **Establishment of a self-sustaining operation with exceptionally low heat and chemical losses.**
2. **Elimination of stream and air pollution problems.**
3. **Use of low liquor-to-wood ratios, thus decreasing cooking steam, increasing residual liquor concentration and simplifying continuous digestion.**
4. **Use of wide variety of wood species, mixed if desired.**
5. **Production of both chemical and semi-chemical pulps with a single recovery system.**
6. **Production of high brightness unbleached easy-bleaching pulps.**
7. **Production of pulps in higher yields and of greater strength than those produced by the acid sulfite process.**

*"The Magnefite Process — A New Pulping Method" by G. H. Tomlinson, technical consultant; G. H. Tomlinson II, research director, and J. R. G. Bryce, N. G. M. Tuck, senior research chemists, Howard Smith Paper Mills Ltd.

Liquor preparation

Primary reason for most of the advantages is the elimination of large quantities of excess sulfur dioxide needed in conventional sulfite pulping. This results in important differences in the cooking liquor and eliminates the need for recycling large amounts of sulfur dioxide for liquor make-up.

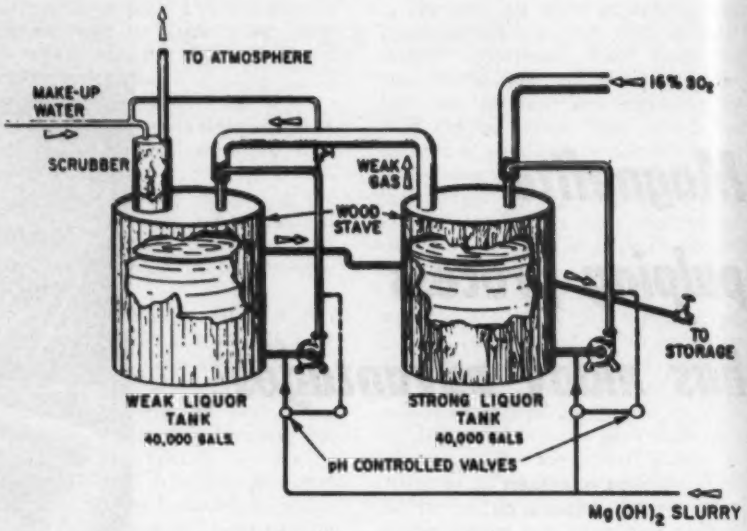
Basic raw material is magnesium hydroxide, a chemically precipitated industrial milk of magnesia. This replaces limestone, used as a source of calcium in calcium acid sulfite pulping. The magnesium hydroxide is received in tank cars as a 30-per cent slurry and is reduced in strength to about 30 per cent. It is pumped to a 40,000-gal. storage tank by an involute pump.

Sulfur dioxide from sulfur furnaces enters a strong-liquor tank in about 16-per cent strength through a venturi (Fig. 1). This gas is delivered at low pressure through plastic ducts approximately 18 in. in diameter. This duct carries the sulfur dioxide into a venturi, through which liquor is recycled at about 1200 gpm. Magnesium hydroxide slurry from the storage tank is pumped into the pump inlets on this liquor recycle line through control valves. The residual sulfur dioxide in the gas vented from this tank (called the strong-liquor tank) passes on to a second venturi located over the weak-liquor tank (Fig. 2). The liquor in this tank is also recycled through the venturi, with magnesia addition at the pump.

The gas leaving the weak-liquor tank passes into a scrubber through which the makeup water is added. This absorbs any SO_2 remaining in the gas, which is then vented to the atmosphere. The liquor overflowing from the weak-liquor tank goes to the strong-liquor tank, and the overflow from the strong-liquor tank goes to the liquor storage tank. From storage strong liquor moves to the accumulator, from which it is fed to the digester. Wet relief from the digester can be returned directly to the accumulator.

Pressure problems eliminated

In this make-up phase there is virtually no excess sulfur dioxide and, therefore, no heat and pressure problems found in the calcium sulfite process. In the calcium process, large quantities of sulfur dioxide are required to dissolve limestone to form calcium bisulfite and to hold it in solution. Much of this is recycled from the various liquor make-up and cooking steps. Heat losses are high, since undesirable gas pressures result unless make-up liquors are maintained at low temperatures. These same limitations apply to the make-up step of magnesium base acid sulfite pulping in which large quantities of gas are also recycled. Simpler equipment may be used in the latter process because of the greater solubility of magnesium sulfite.



Liquor make-up in the magnefite process.

With the new magnefite process, however, the lack of excess sulfur dioxide eliminates pressure problems and makes it possible to utilize heat. Dr. Tomlinson feels that even the heat from sulfur burners can be utilized. Hot water returned from digester and blow-pit steam condensate can be used in make-up. Only a small quantity of sulfur dioxide is released during the digester relief and blow, so complex equipment needed in other processes is not necessary with magnefite.

Shortened cooking cycle

In the cooking phase of the new process the lack of excess sulfur dioxide in the liquor makes possible a faster cook. In calcium and the older magnesium base processes liquors must be heated gradually to prevent chip burning. This can occur when gaseous sulfur dioxide jumps air gaps in the fine structure of a partially impregnated chip and reaches the center of the chip before it can be neutralized by the base. No such reaction can occur with magnefite, according to Dr. Tomlinson, so the rate of heating is not critical. In a conventional digester, by increasing the rate circulation and the surface area of the heat exchangers, or by using indirect steam, the digester can be brought up to cooking temperature in an hour or so. Utilization of heat sources in liquor make-up also shortens the time required to bring cooking liquor to full temperature. A low required liquor-to-chip ratio allows additional heat savings. With a continuous digester chips previously impregnated with cooking liquor can be heated instantaneously by being dropped into a chamber maintained at cooking temperature by the continuous addition of steam.

This shortened cooking cycle means increased digester capacity of about 50 to 100 per cent. Dr. Tomlinson points out that in a new mill a much smaller digester house would be required, thus greatly reducing one of the largest items of capital expense in sulfite pulping.

Permits pulping of pine

The lower acidity of magnefite liquor—from pH 3.5 to 4.5 as compared to pH 1.5 for acid sulfite liquor—makes it possible to pulp pine. With the standard sulfite process, the acidic liquor causes a reaction between phenols and the active groups in lignin and thus prevents the dissolution of the lignin in the cooking liquor. This reaction is considerably reduced with magnefite. Small quantities of bark, which contains phenols, also become less critical in magnefite pulping.

Heat and water economy

Small amounts of sulfur dioxide generated during the cook in magnefite can be relieved during the cook, whereas in conventional sulfite pulping a difficult, expensive and lengthy stripping operation is necessary to recover the large amounts of sulfur dioxide released during the blow. Condensate

(Continued on page 674)

Adhesives in the paper industry

Part III — Classification of adhesives

THERE IS A VARIETY of ways to classify adhesives. For example, they may be classified according to their function — i.e. textile adhesives, paper adhesives, wood adhesives, acid-stable adhesives, alkali-stable adhesives, metal adhesives and a wide variety of terms relating to end uses. The adhesives may also be classified according to their physical state, such as liquid, paste, supported or non-supported films and powders. They may be classified according to whether they are thermosetting or thermoplastic, or according to whether they are of natural or synthetic origin. Still another classification depends on their chemical constitution which may be protein, carbohydrate, natural or synthetic rubber, a wide variety of synthetic resins, or inorganic materials such as sodium silicate.

Braude (1) classifies adhesives according to whether they are of animal, vegetable, or synthetic origin. If one adds mineral origin to this classification, it will be sufficiently flexible to include virtually all of the adhesives currently known. This may be demonstrated by the tabulation in Table III.

Table III

ANIMAL ADHESIVES

1. Animal Glue	The aqueous extract of the skin, bones or connective tissue of animals.
2. Fish Glue	The aqueous extracts of the bones and skins of fish. Fish and animal glues are similar and are both used for the manufacture of liquid glues. Fish glue, unlike hide glue, is liquid at room temperature without the addition of liquefying agents. It may be modified by a variety of plasticizers, tackifiers or resinous materials.
3. Blood Albumin	The protein material obtained during the processing of animal blood. It is used in combination with synthetic resins, cellulosic adhesives and other proteins.
4. Casein	A protein obtained by precipitation from skim milk. The casein is mixed with alkali to obtain a water-dispersible pastes.

VEGETABLE ADHESIVES

1. Vegetable proteins	These include soybean protein and zein from corn. The latter is an important adhesive in the plywood industry.
2. Gums	Materials of plant origin which dissolve or swell in water. Gum arabic extracted from Acacia trees is the best known vegetable gum adhesive and is used for postage stamps. For the most part, vegetable gums do not give as strong adhesives as animal glues. Their quick tack, however, makes them valuable for use as postage stamp and envelope adhesives. They are frequently modified by the addition of plasticizers such as glycerol. Gum tragacanth is a water-dispersible gum, valuable as a thickener for protein and starch adhesives.
3. Cellulose adhesives	These adhesives are partially synthetic since they are formed by subjecting natural cellulose from wood or related sources to a variety of chemical reactions. From these reactions, one may obtain cellulose nitrate (nitrocellulose), cellulose acetate, ethyl cellulose, methyl cellulose and sodium carboxymethyl cellulose. The first two materials are used as lacquer-type adhesives from organic solvents. They are useful in the shoe industry. Ethyl cellulose provides the basis for hot-melt adhesives for the packaging industry. Methyl cellulose and sodium carboxymethyl cellulose are water-dispersible adhesives that find application as thickeners and modifiers for other water-based adhesives and also, in their own right, as packaging adhesives.
4. Starch and dextrin adhesives	Starch (particularly wheat starch) can be dispersed in water to provide, among other things, wallpaper adhesive. When starch is degraded by high temperatures, a wide variety of dextrins result. Enzyme and chemical treatment also provide dextrins. These are used as envelope adhesives and for a variety of other paper uses. They are not water-resistant.
5. Natural rubber adhesives	Rubber latex (which occurs in the bark of rubber trees) when subject to certain modifications, is useful as an adhesive. Natural rubber or reclaimed natural rubber in appropriate solvents provides the basis for "rubber cement" and for other rubbes-based adhesives.
6. Natural resin adhesives	A variety of natural resins form the basis for of adhesives. Included are rosin and esters of adhesives or serve as modifiers for other types rosin prepared with glycerol and pentaerythritol. These are particularly valuable as tackifiers for other adhesives. Shellac is an insulating-type adhesive, and asphalt is used as an adhesive for various mineral substances. Oxidized linseed oil (linoxyn) may be considered as a natural resin which provides the adhesive basis for linoleum manufacture. Rosin soaps are also used in the formulation of adhesives.

INORGANIC ADHESIVES

1. Sodium silicate	An inorganic salt widely used by the paper industry.
2. Portland cement	The adhesive basis for mineral aggregates.
3. Magnesium oxychloride	An adhesive of value in the ceramic industry.
4. Plaster of paris	An inorganic salt, calcium sulfate, which finds adhesive use in ceramics and many other industries.
5. Litharge-glycerol	An adhesive which is only partially inorganic, since it depends on the interaction that takes place between litharge (lead oxide) and glycerol to give a strongly adhesive thermoset mass. It is widely used in plumbing.

SYNTHETIC RESIN ADHESIVES

1. Aldehyde-based condensates	Included here are a wide variety of thermosetting adhesives based on the condensation of formaldehyde or furfuraldehyde with reactive molecules, such as phenol, resorcinol, urea, melamine and aniline. These find use in the plywood industry and as structural adhesives for a variety of applications.
2. Epoxy adhesives	These are various formulations, all based on epoxy resins, which may be combined with curing agents such as diamines, dicarboxylic acids, urea or melamine resins, phenolic resins, polyamide resins and thiokol resins. All of the

	compositions are thermosetting, and are widely used for structural applications such as honeycombs and where metal-to-metal bonding is important.
3. Polyurethane adhesives	These are thermosetting adhesives based on the interaction of di-isocyanates with polyesters or other hydroxyl-containing compounds. They have high adhesive strength and are used for structural purposes.
4. Polyester resins	Included here are a wide variety of chemical substances such as oil-modified alkyds, polyesters from unsaturated acids such as maleic anhydride which are subsequently copolymerized with styrene and polymers of materials such as diallyl phthalate. These materials are used as adhesives in the electrical industry and as adhesives for glass fiber for reinforced plastics.
5. Vinyl adhesives	Included here are polyvinyl acetate and copolymers of polyvinyl acetate and polyvinyl chloride. These are used as metal and wood adhesives and in the bookbinding industry. They are available as aqueous dispersions, in solvent solutions and as organosols and plastisols. They are thermoplastic adhesives. Included, also, in this category is polyvinyl butyral which is used as the adhesive layer for safety glass. Polyvinyl ethers are used for paper and wood adhesives.
6. Polystyrene	This thermoplastic material may be used either as an aqueous dispersion or as a solvent solution. It finds application in the shoe industry.
7. Synthetic rubber adhesives	These are materials such as polyisobutylene, chlorinated rubber, rubber hydrochloride, cyclized rubber, polychloroprene (Neoprene), butadiene-acrylonitrile copolymers, butadiene-styrene copolymers and a variety of related materials. They are used in adhesive tapes, as foil adhesives, and as rubber, metal, leather and paper adhesives.
8. Miscellaneous synthetic adhesives	These include polyamides, which are used for paper, wood, and metal adhesives; silicones which are used where good electrical insulation and high temperature adhesives are required; various acrylic adhesives; coumarone-indene, and petroleum resins which are used as compounding agents for other resinous adhesive combinations; polyvinyl pyrrolidone, an adhesive additive for a variety of materials; and polycarbonate resins like "Lexan" which are structural adhesives.

Magnefite

(Continued from page 672)

from digester steam can be recycled to liquor make-up in magnefite operation, and condensation from the blow can be used for pulp washing and other operations, representing a saving in both heat and water.

In the magnefite process the pressure is controlled at or slightly above the steam pressure corresponding to the cooking temperature (for example, 90-100 psi at 166°C). After about four hours of steaming, the pressure may be reduced to 50 psi and the digester blown; or, since the vapor from the blow contains only traces of SO_2, the digester may be blown at full pressure.

Recovery simplified

In the recovery phase the new magnefite process allows use of simpler heat recovery equipment since heat may be used directly to raise liquor temperature. In both processes the spent liquor is evaporated to a concentration of about 55 per cent solids, which are burned in a recovery furnace. Steam and water recovered from both the evaporators and from the recovery furnace are usable with magnefite pulping.

Reeovery in both the magnesium base acid sulfite process and the magnefite process returns about 85-90 per cent of both the magnesium hydroxide and the sulfur dioxide gas back to make-up.

Other advantages

Conversion of an existing mill on a plant test or commercial basis is greatly simplified by the use of magnesium hydroxide slurry rather than dry magnesium hydroxide or magnesium oxide. Very little modification is usually required to unload the slurry from the tank car and introduce it into the liquor make-up system. Provisions for bulk handling and slurrying a dry product are unnecessary. This advantage of the versatile slurry form also applies in converting to the older magnesium base process.

In some areas of the United States there may be an economic advantage to using the dry form of magnesium hydroxide or to using magnesium oxide as a magnesium source.

Based on findings under controlled laboratory conditions, Howard Smith research personnel report other advantages in addition to those of a direct processing nature.

One of these is in pulp bleachability. Magnefite pulps generally have shown improved strength over other sulfite pulps, while retaining the easy bleachability characteristic of sulfite pulps.

A study of different cooking times employing the magnefite liquor indicates that pulp yield can be increased by about 5 per cent over calcium sulfite pulping yields, and that the process is also adaptable to semichemical pulping, employing the same recovery used in chemical pulping.

Laboratory tests also show that use of mixed species in pulping becomes practical with the new process, a distinct economy feature.

Processing advantages and pulp quality improvement features, coupled with the ease of conversion to magnefite pulping, are expected to focus a good share of attention from the pulp and paper industry on the new process.

Marathon

(Continued from page 670)

treated by the demineralizer contains 1 ppm of total dissolved solids and 0.05 ppm of silica. The demineralizer features two 7½-ft. dia. rubber lined cation units, two 7½-ft. rubber lined anion units, an automatic control panel, and a regeneration system for the cation and anion units.

Each cation unit contains a 30-in. bed of high capacity styrene cation resin and each anion unit contains a 30-in. bed of Type 1 strong base anion resin. Both units are equipped with an automatic hydromatic single-control valve complete with integral back wash and rinse regulators.

The automatic control panel has meters for recording the flow of raw water to the plant and of demineralized water from the plant; it also has automatic cycle controllers and conductivity instruments for measuring conductivity from the anion units.

The regeneration system is designed for in-line dilution in which the flow of concentrated regenerant is automatically metered and mixed with a metered quantity of dilution water in a closed system.

Effluent disposal system

To protect the Tombigbee River from pollution, an elaborate $600,000 effluent system was constructed. The disposal system covers an area of more than 200 acres and features a giant clarifier that separates water from the sludge, sending the water to a 175 acre storage pond and the sludge to a 35 acre sludge lagoon. After a retention of 5-30 days in the storage pond, water is fed into the Tombigbee River through a perforated pipe system.

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Are you ready for the 60's?

J. KASSIDAY

▶ Paper and board consumption in 1965 is estimated to be 49,000,000 tons and production 42,000,000 tons — which will require a capital investment of more than $7,000,000,000 in new plant and equipment.

PROGNOSTICATORS ARE close to unanimous in their prediction that economic activity will reach new peaks in the 60's. To a large extent this optimism is based on two factors: (1) the tremendous growth in population which is now occurring and which is expected to increase in the 60's, and (2) the expectation of a continuing rise in living standards resulting from an increased ability to consume as a result of greater income distributed among more people and a growing desire to consume as a result of the increasing awareness of what is available and the desire to compete with one's neighbor.

Based on continuing studies at Stanford Research Institute, it is expected that by 1965 our national population will gain another 13 per cent over its 1957 level, reaching a population in 1965 of nearly 191,000,000 people—and by 1970 a population of about 205,000,000. It is further expected that by 1965 this population will have an income, as a measure of economic activity, about 25 per cent greater than it was in 1957, and that by 1970 economic activity will be close to 18 per cent higher than in 1965. That is, we expect the level of business activity about 12 years hence to be about 50 per cent higher than it was during the past year.

Paper and board consumption in the 60's

Based on these projections, it is estimated that paper and board consumption in the United States by 1965 will be about 49,000,000 tons, an increase of about 40 per cent over consumption in 1957. By 1970 it is estimated that this consumption will rise to about 58,000,000 tons, or an increase of about 66 per cent over 1957. Projected production of paper and board for the U. S. are 42 million tons for 1965 and 50 million tons for 1970.

These figures and their implications may have more meaning if we examine what has happened from 1947 to the present.

In 1947 total consumption of paper and board was estimated at 24.8 million tons in 1958; for 1958 consumption of paper and board is estimated at 35.3 million tons. This was an increase of 10.5 million tons in paper and board consumption from 1947 to 1958.

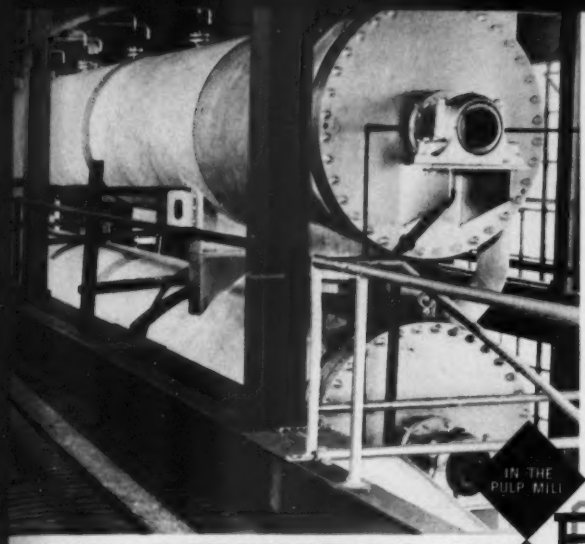
In 1958 it is estimated the pulp and paper industry will produce 30.7 million tons of paper and board. In 1947 the pulp and paper industry produced 21.1 million tons of paper and board. This was an increase of 9.6 million tons in paper and board production in the period 1947 to 1958 inclusive. In the same period 1947 to 1957 paper and board capacity has increased from 22.0 million tons in 1947 to 36.1 million tons in 1958 or an increase of 14.1 million tons in capacity. These increases in production and capacity were accompanied by an investment of approximately $5.8 billion in new plants and equipment. In the period 1947 to 1957 the value of annual sales for the pulp, paper, board and products industry increased by over $5 billion. The projected production level of paper and board for 1965 is 11.3 million tons greater than for 1958.

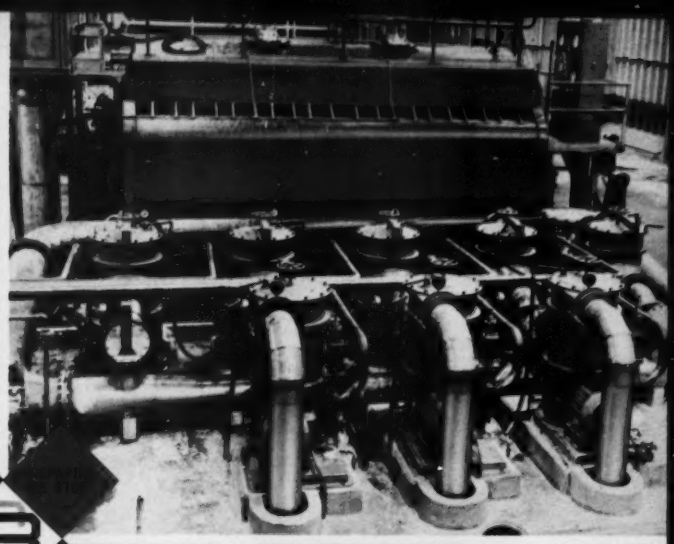
The predicted consumption level of paper and board for 1965 is 49 million tons. This is an increase of 13.7 million tons over 1958. Comparing these figures with the 10.5 million ton increase which has occurred since 1947 in consumption and the 9.6 million tons which have occurred in production, we can see the scope of the opportunity and the problem which faces the industry. A capital investment of $5.8 billion was required to bring us to our present level from that of 1947; the projected increase in consumption for 1965 is approximately fifty per cent greater than that which occurred from 1947 to 1958. On this basis the necessity of a capital investment of approximately $8.3 billion in the next seven years is indicated. A more conservative estimate (and probably more accurate) of capital expenditure requirements to attain 1965 goals would be based on the projected increase in production. On this basis an expenditure of $6.8 billion for new plants and equipment would be necessary.

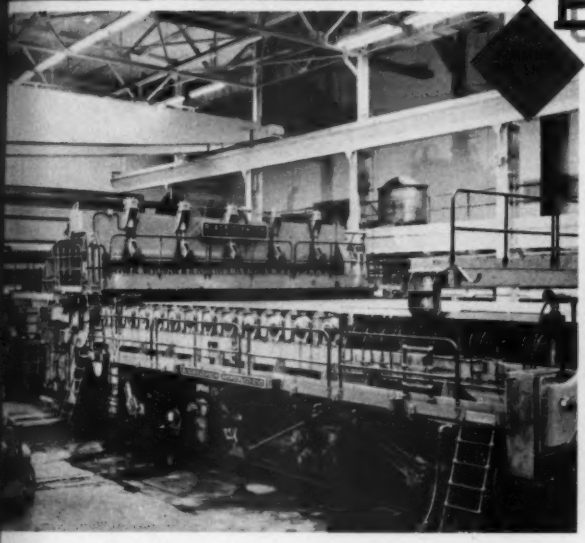
These estimates do not take into account the trend toward increased cost of new plants and equipment. Concurrent with this increase in capital expenditure the total sales of the industry should increase tremendously by 1965. The increase in production of 9.6 million tons which occurred from 1947 to 1948 was accompanied by an increase of $5 billion in sales. The contemplated increase of 11.3 million tons in production from the present to 1965 would on this basis result in an increase in sales of $5.9 billion in 1965. This would result in a level of sales of approximately $16.7 billion in 1965 for the industry.

The opportunities offered for the future of the paper industry are enormous. The problems which these opportunities will create are also great and will bring increasing pressure for greater efficiency in production and, probably more important, in distribution.

No mention has been made of the tremendous contributions which have been made to industry growth through production of new products and new uses for old products. The ability to broaden the market for the paper industry through adaptation and technical innovation which has been demonstrated in the past augurs well for the 60's.







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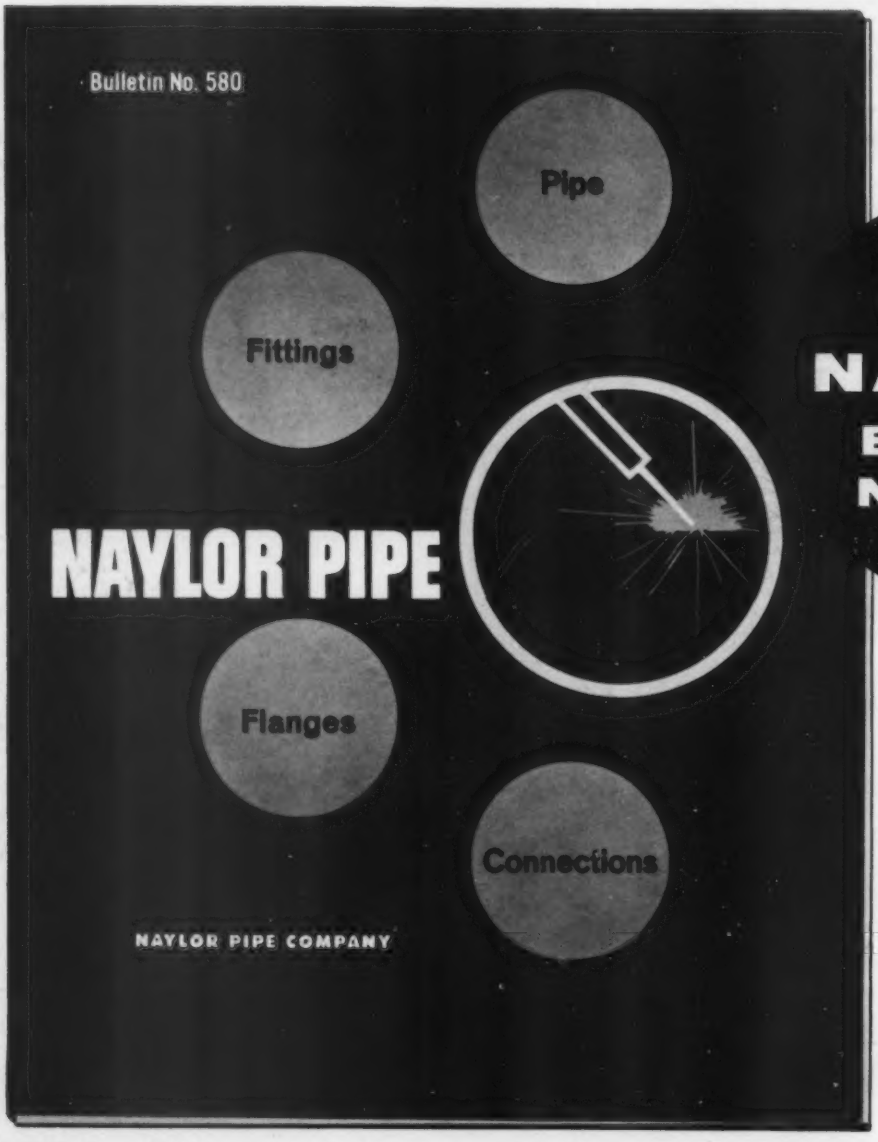

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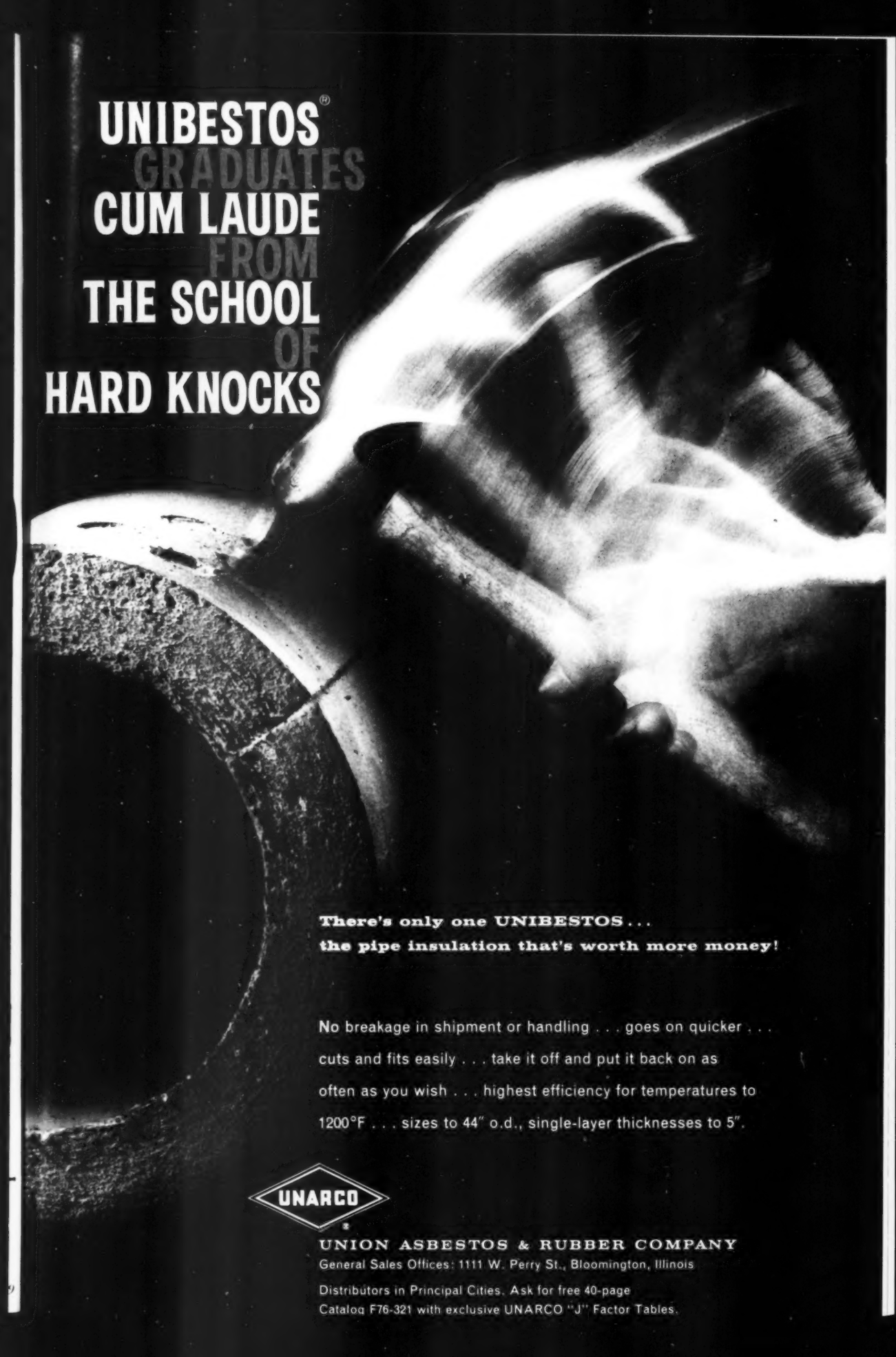

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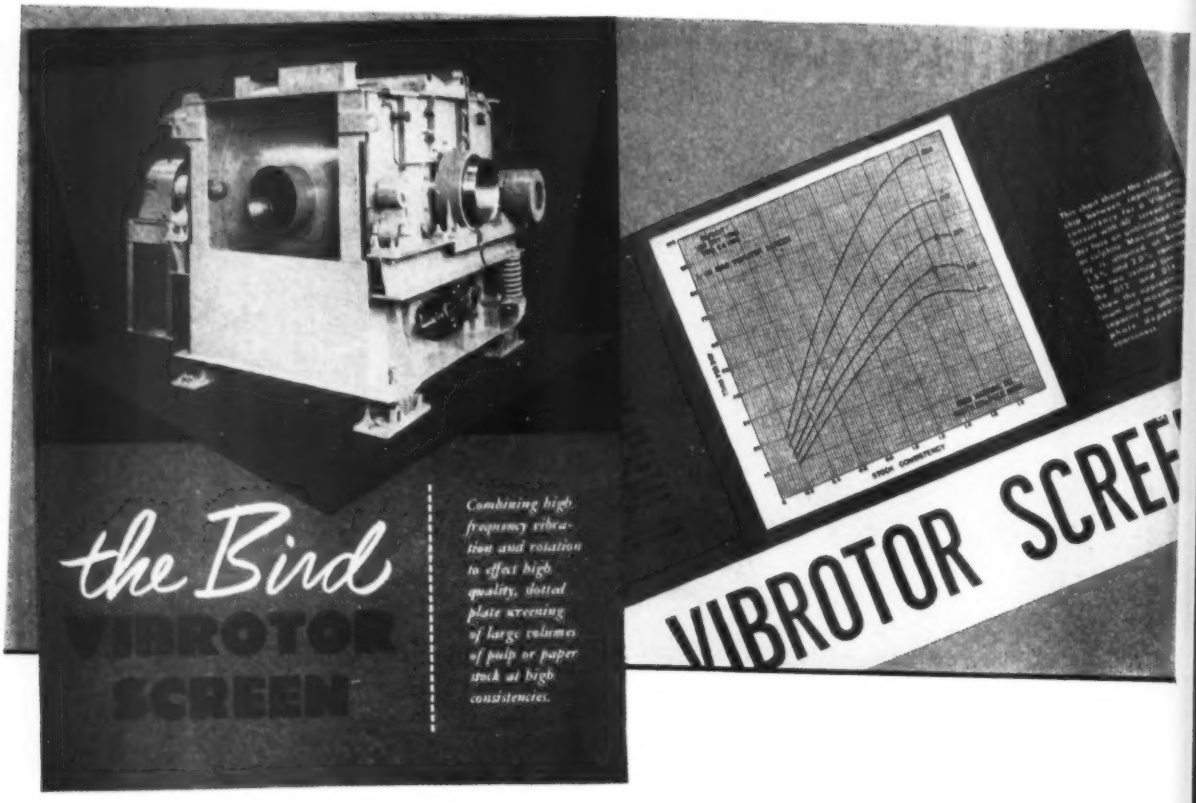
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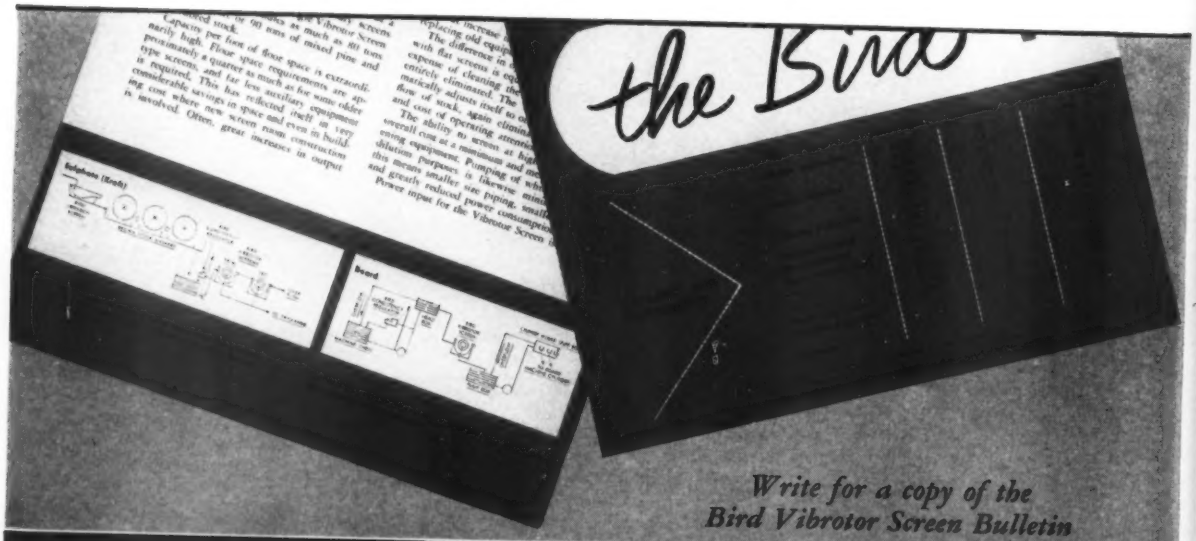

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CURRENT COMMENTS

Business recession ends . . . unanimous decision . . . and model forests

By WARREN B. BULLOCK

Surest indication that the business recession has ended as far as the paper industry is concerned is found in the resumption of announcements of planned expansions. About a year ago, when the business outlook was beginning to cloud over, plans for expansions involving hundreds of millions of dollars were abandoned entirely or sharply curtailed. It is a matter of history in the paper industry that there is either a feast or a famine. In the present period, however, the duration of the famine has been far shorter than has been the case in years gone by.

Crown Zellerbach's president, A. B. Layton, has told a Louisiana business men's group that his company is looking forward to a new mill near De-Ridder, La. His company has already acquired extensive timberlands in this region. The date of beginning construction merely rests on how soon business conditions are definitely and permanently improved.

Potlatch Forests Inc. of Lewiston, Idaho, is planning to build a $30,000,000 mill near Little Rock, Ark., in the general vicinity of its 350,000 acres of timberlands. The precise location rests on the results of surveys to determine the presence of underground water and its relation to existing timber.

These are examples of the manner in which paper companies are expanding outside their former production areas, and how two companies which have been predominantly Pacific Coast operators are invading the South and Midwest. Crown Zellerbach is about to open a Louisiana mill owned jointly with Time Inc., and with its projected expansion into Newfoundland. On the other side of the picture International, with its purchase of the huge Long Bell interests on the Pacific Coast, has invaded the western empire of its great rival and is no longer confining its operations to the South, East and Canada.

Expansion not in sight

Expansion in the newsprint field, however, is not yet in sight. No new newsprint machines are being installed for the first time in eight years. Nevertheless, present figures indicate that the potential output for 1959 will be increased 350,000 tons by bringing existing machines, some of them materially improved, into their full potential.

Peter B. Hoguet, president of the Econometric Institute, told the annual meeting of the National Paperboard Association that 1959 demand will probably reach a new high of 15,000,000 tons — a five per cent increase over any previous record. The fastest growing demand in this field is said to be in the special food board field.

Looking farther into the future, the United Nations, through its Food and Agriculture Organization, forecasts a doubling of the present world consumption of pulp and paper products within 18 years.

Good news in the industry has centered in companies in the fine paper field. The Bergstrom company increased its quarterly dividend from a former 20 cents per share to 30 cents; Sorg, paying 10 cents quarterly, has declared an extra of 5 cents plus 3 per cent in stock; American Writing, which added 25 cents extra to its usual quarterly payment of 25 cents in September, has raised its quarterly rate to 40 cents, plus a year-end extra of 60 cents. In the specialty field, Paterson Paper increased its regular rate. Central Fibre in the paperboard area, added an extra of 25 cents to its current quarterly of 25 cents, and United Board and Carton tacked an extra of 10 cents to its quarterly 25 cents per share. These advances may be part of the general growth of the paper industry. This is summarized in a report by the American Paper and Pulp Association stating that the industry has doubled its assets since 1947 due to investment of many billions of dollars in new plants and equipment.

Tariff Commission's decision

The United States Tariff Commission, in a unanimous decision, has ruled that the United States manufacturers of wrapping tissue paper failed to prove injury sufficient to justify the imposition of anti-dumping duties. Under the Anti-Dumping Act as revised by the last Congress, dumping duties are levied only when merchandise, sold at less than the normal value in the country of origin, is held by the Tariff Commission to have caused injury to a domestic industry. The Commission, after an exhaustive hearing in the wrapping tissue case, ruled that the amount of paper imported was so small that it could not constitute injury to the domestic producers. The decision, while recognizing that the paper was sold at an unduly low price, pointed out that the total imports were less than three per cent of the domestic consumption. Of this amount about two per cent was from Finland and less than one per cent from Norway. The fixing of this yard stick for determination of injury may largely restrict the opportunity of domestic industries to secure relief from under-priced foreign competition.

Establishment of pilot forests

In April, the Southern Pulpwood Conservation Association will launch a program for the establishment of Pilot Forests in 100 counties of 12 Southern states. Model miniature forests will be developed to help educate private land owners.

Financial Reports

How far back the paper industry has come since the gloomy days of late 1957 is shown graphically by the comparison of prices in Wall Street for paper mill securities in middle December as compared with the same date a year ago. Many of the standard issues increased in value as much as 50 per cent in the year.

Net incomes

Certain-Teed Products Corp.—For the nine months, $1,111,073; a year ago, $1,745,166.

Chesapeake Corp. of Virginia—For 40 weeks to October 3, $1,993,180; a year ago, $2,694,257.

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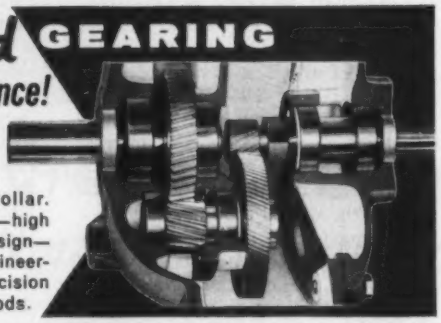


Duti-Rated Gearing is the heart of Foote Bros. Motorized Drives . . . drives that give you more load capacity and wear life per dollar. This is premium quality gearing—high hardness, accurate, balanced design—the product of thousands of engineering and development hours, precision tooling and manufacturing methods.

FOOTE BROS.

Line-O-Motor

1 to 75 HP...Double, Triple Reductions... Ratios: 5:1 thru 238:1

Line-O-Motor Drives accept any NEMA frame motor . . . permit you to use your own motor or specify type to meet plant standardization. Foot or flange mounted.

Write for CATALOG MRA. It has complete details and selection data on Foote Bros. Motorized Drives.

100 YEARS SERVING INDUSTRY 1859-1959

FOOTE BROS.

Better Power Transmission Through Better Gears

FOOTE BROS. GEAR AND MACHINE CORPORATION

4551 SOUTH WESTERN BOULEVARD • CHICAGO 9, ILLINOIS

Current Comments . . .

Combined Locks Paper Co.—For the nine months, $509,290; a year ago, $656,238.

Container Corp. of America—For the September quarter, $3,743,000; a year ago, $3,557,000.

Crown Zellerbach Corp.—For third quarter, $9,250,000; a year ago, $9,216,000. The nine-month total net was $23,440,000; a year ago, $26,181,000.

Diamond Gardner Corp.—For the quarter ending September 30, $1,744,000; a year ago, $1,974,000.

Fibreboard Paper Products Corp.—For the September quarter, $1,720,353; a year ago, $1,262,549.

Stock and Bond Quotations

New York Stock Exchange Stocks

Closing Prices	Dec. 10, 1958	Nov. 10, 1958
American Can	50¼	49¼
Same Pref.	° 39-39¼	39
Celotex	36⅛	33
Same Pref.	19	17⅝
Certain-Teed	13⅜	13⅛
Champion P. & F.	° 38-38½	42
Same Pref.	97	93½
Chesapeake	36¼	37⅛
Container	28½	29½
Same Pref.	° 91-93	° 90-92
Continental Can	58	60⅜
Same Pref.	° 84½-88½	° 83-84½
Crown Zellerbach	56⅛	55⅝
Same Pref.	93	93½
Diamond Gardner	32¼	31¾
Same Pref.	° 41-45	30⅞
Fed. Paper Board	49½	46⅜
Same Pref.	21½	21
Fibre Paperboard	49⅜	42⅞
Same Pref.	159	148
Great Northern	51	52¾
Hammermill	31	30¼
International	115⅜	121
Same Pref.	° 90-91	° 91½-93
Kimberly-Clark	69½	68¼
McAnderws & Forbes	31⅛	28¼
Masonite	40⅛	35⅝
Mead	42⅜	44½
Same Pref.	° 93-95	° 92½-94½
Minnesota & Ontario	35⅝	34⅜
Oxford	32⅜	35½
Same Pref.	91½	° 90-92½
Rayonier	20¼	21
Riegel	35¼	° 38-38¼
St. Regis	46¾	44⅜
Same Pref.	° 93-95	° 96½-97
Scott Paper	72½	74
Same $4 Pref.	° 94-95½	95½
Same $3.40 Pref.	° 78¼-79	° 75-77
Sealright	42¼	38¾
Standard Packaging	26⅜	23⅜
Same $1.60 Pref.	86	° 68½-71
Same $1.20 Pref.	31¾	29¾
Sutherland	38½	39m⅛
Union Bag-Camp	40¾	42¾
United B & C	27¼	29
United Wallpaper	8¾	8¾
Same Pref.	° 16½-19	° 16-19¼
U. S. Gypsum	97½	96½
Same Pref.	158	°155-158
West Virginia	41¾	41¼
Same Pref.	° 99½-100½	° 98-100

New York Stock Exchange Bonds

Champion P & F 3¾%	—	—
Champion P & F 3%	98	95
Kimberly-Clark 3¾%	93⅛	93⅞
Mead 3%	—	—
Oxford 4¾%	111⅛	—
Diamond Gardner 4%	97½	—
Scott 3%	106½	105¾

American Stock Exchange Stocks

Allied Paper	9⅞	9¼
American Writing	32	25⅜
Brown	14	13
Puget Sound	° 18-18½	18

°Closing Bid and Asked Prices

NEWS of the INDUSTRY

$12,000,000 Beats the New Brunswick Budworm

The spruce budworm "appears to have been whipped in New Brunswick". The total investment: $12,000,000, fleets of aircraft and seven years.

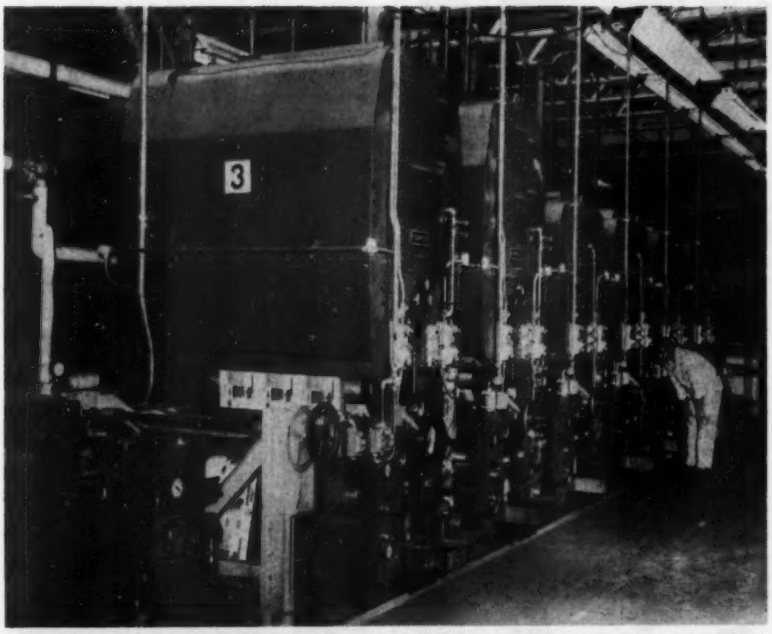
Saved: 6,000,000 acres of rich forest lands.

Gained: The know-how to deal with any future outbreak of budworm infestation.

Result: There will be no mass spraying of the provincial forests in 1959.

Under threat seven years ago was nearly 33 per cent of New Brunswick's woodlands. It was then that the aircraft spraying program started.

According to Dr. F. E. Webb, a provincial forest biologist, "all indications are that trees sprayed over the past seven years have resisted the attacks and are in good condition". He warns, however, that government and industry must maintain constant watch for new outbreaks. The alternative, Dr. Webb declares, is the "virtual destruction of much of the pulpwood crop in northern New Brunswick".



NEW GRAVURE OPERATION at the Gardner Div. of Diamond Gardner Corp. in Lockland, Ohio, is housed in a recently completed $3,000,000 structure containing 201,000 sq. ft. of floor space. Typical of the installations is the six-color 44-in. Champlain press above. Others include a four-color 44-in. Champlain, a six-color 42-in. Staude and a five-color 26-in. Staude. In one continuous operation each unit does a complete job of printing, cutting cartons to shape and creasing to allow easy set-up at the customer's plant. Among the many carton types finished at the plant are soap, cereal, wax paper, butter, hard cigarette packs, cigarette cartons, bottle and can carriers for beer and soft drinks. (In addition to the gravure operation, the firm's Lockland facilities include a paperboard mill, a retail box plant and a carton plant.)

Newsprint Takes a Breather, Yet Capacity Continues to Grow

After 10 years of dramatic expansion, the North American newsprint industry in 1959 will take its first breather. This according to a recent report released by the Newsprint Information Committee.

For the first time in eight years no new newsprint machine is set for installation next year. However, capacity will be swelled by 550,000 tons —representing for the most part the addition of the full annual potential of machines completed during 1958 and operating for only part of that year. The balance of the gain will be the result of plant improvements.

It was pointed out that North American capacity surged to 9,300,000 tons during 1958. However, the report continued, "it appears that demand will total about 7,800,000 tons (in 1958). Thus, it is likely that the 1958 requirements of United States publishers and other customers will be met without drawing on about 1,500,000 tons of existing capacity".

Carrying charges and other expenditures in connection with these idle facilities are cutting sharply into mill earnings despite an intensive program of economics.

Work Starts on Halifax $6,000,000 Project

Paper mill improvements—including a new paper machine—have been undertaken at Halifax Paper Co. Inc. in Roanoke Rapids, N. C. Design and construction for the $6,000,000 program are in charge of Rust Engineering Co. of Pittsburgh.

The new Beloit Iron Works paper machine will have a daily capacity of 225 tons of heavyweight paper and is scheduled for completion in the spring of 1959. Wire width is to be 246 in. (The unit is to be installed adjacent to a sister 246-in. Beloit machine placed in operation in 1951.)

Rhinelander Completes $4,300,000 Project

A modernization project costing $4,300,000 has been completed at Rhinelander Paper Co. (subsidiary of St. Regis Paper Co.) of Rhinelander, Wis. The program was designed to improve the steam and electric generating capacity of the plant.

Benton R. Cancell, president of Rhinelander, stated: "The mill had been short on steam output and electric energy. The new project not only relieves this shortage but gives

Hop On The Jenkins' METLKOR Bandwagon

You'll have plenty of company, for Paper Mill men everywhere are using Jenkins' METLKOR brushes for every paper brushing application. They are built better, to perform better, and last longer.

Jenkins' METLKOR Paper Polishing Brush.

JENKINS' PAPER MILL BRUSHES

Blanket washer • Coating • Conveyor • Dampening • Dusting • Feed • Felt cleaning • Flocking • Fourdrinier wire cleaning • Nutmeg roll cover • Offset powder removal • Paint brush • Polishing • Scrap removal • Sieve • Spray • Static elimination • Void detector • Web cleaning.

BRUSHES FOR PRINTERS: Cylinder hold down • Dusting • Nutmeg roll cover • Offset dampener roll cleaning • Offset powder removal.

Specify Jenkins' METLKOR the original . . . the best *Metal-Core* brush

METLKOR®
CYLINDER BRUSHES
and **LIFEWOOD®** WOOD BACKED BRUSHES

M. W. JENKINS' SONS, INC.
Serving Industry for Over 80 Years
742 Pompton Ave., Cedar Grove
Essex County, N. J. • CEnter 9-5150

News of the Industry . . .

the mill ample power potential for any possible future expansion".

Construction in this project included a 48- x 71-ft. addition to the plant that accommodates a new boiler. The boiler has a capacity of 260,000 lbs. of steam per hour at 1500 lbs. pressure psi and 950°F temperature. The furnace will burn about 264 tons of coal daily and is capable of evaporating 600 gal. of water a minute at full capacity.

A water treatment plant was also erected to prepare water for the new boiler. The plant filters and demineralizes water from the Wisconsin river. As part of the new system, a new 10,000 kilowatt turbine generator was also installed.

Continental Can Opens Michigan Plant

Continental Can Co. has put into operation its new Paper Container Div. plant in Three Rivers, Mich. Located on an 80-acre site, the one-story structure is divided into four principal sections: manufacturing; warehousing; offices and cafeteria, and boiler room and service equipment.

The manufacturing area is humidity-controlled and air conditioned. Heating, cooling and moisture control is accomplished through a central panel in the control room. Once the controls have been set, the equipment will automatically maintain moisture at a constant humidity.

Production consists altogether of food containers and hot and cold drink cups, which are turned out at a daily rate of well into the millions.

The manufacturing area is enclosed with windowless walls and is fully equipped with modern daylight lighting and the latest in production machinery. (Continental Can is continuing to produce paper plates at the old Three Rivers plant.)

Wastepaper trimmings are automatically collected by a pneumatic conveyor and blow pipe system that carries it to the baling presses, where it is compressed in large bales for shipment to paper mills for reprocessing.

Also installed at the new Michigan plant are new gravure and flexographic printing presses and the latest type facilities for receiving and storing wax in liquid form.

Factory Addition at Los Angeles

An important factory addition to increase boxboard production is underway at the Los Angeles plant of the Boxboard & Folding Carton Div.

The extension will house new stock preparation equipment that will make possible an expansion of board machine output. This is the first step in a modernization program designed to increase the mill's capacity to 8000 annual tons of high-quality boxboard.

In another Continental Can action, the Conolite Department (consisting of research, manufacturing and sales in plastic laminates) has been integrated with the comparable functions of the Flexible Packaging Div.

New Marathon Southern Plant in Operation

Following two years of construction, the plant of Marathon Southern Corp. in Naheola, Ala., is nearing completion. And already pulp produced at the new mill is being shipped to Marathon production units throughout the country, where trial runs are underway. (Marathon is a division of American Can Co.)

In the process of start-up at Naheola is the plant's own No. 1 paper machine. Test runs are in progress.

Beginning with unbleached pulp production in August, the plant next produced semi-bleached and more recently, with the completion of the bleach plant, switched to fully bleached pulp.

With full production, the plant will turn out pulp and paper for its own use, for other Marathon mills and for sale to market customers. Toilet tissues, towels and napkins are to be produced in an adjacent converting plant.

The two paper machines—one a Yankee and one a fourdrinier—will produce grades of paper ranging from lightweight sanitary tissue to the lighter weights of solid bleached paperboard.

Three Firms Announce Plans to Merge

American Box Board Co. of Grand Rapids, Mich., Central Fibre Products Co. of Quincy, Ill., and Ohio Boxboard Co. of Rittman, Ohio, has announced plans to merge their companies.

In their respective areas, all three companies have been successful in the packaging products field. The consolidation will bring together facilities producing jute and kraft linerboard, boxboard, bleached kraft, corrugating medium, molded pulp products, egg packaging products, shipping containers and folding cartons, in an area stretching from New York to Utah.

Recent Expansions in the Industry

Banner Fibreboard Co.,
a producer of linerboard specialties, has completed a plant improvement program at Wellsburg, W.Va. Designed to improve the finish and color characteristics of the firm's colored linerboard, the project featured the installation of a No. 10SD6 Hydrabeater supplied by the Shartle Div. of Black-Clawson Co. The unit replaces a Niagara tub beater and will allow improved strength, better top liner finish, a greater variety and more uniform colors. This enables the use of a three-stock system and the use of more types of raw materials—including wet-strength papers. Wider calender rolls have been placed in service to increase Banner's maximum width to 80 in. A newly installed rewinder makes possible the production of rolls up to 60 in. in diameter.

Olin Mathieson Chemical Corp.
will open a corrugated container plant in Kansas City, Kan., to replace the present facility. The new operation will boast a corrugating machine, as well as the finishing equipment necessary for the production of boxes of all sizes, weights and tests. Production was scheduled for late in 1958.

Hammermill Paper Co.
has reported that the merger of Watervliet Paper Co.—wholly owned subsidiary—into the parent firm has been approved by Hammermill stockholders. The Watervliet, Mich. company produces semichemical pulp and book and offset papers.

First Mississippi Corp.
will build a million-dollar plant for the manufacture of multiwall paper bags. The site conditionally chosen is Yazoo City, Miss. The proposed facility will be designed to convert a monthy 1000 tons of paper.

St. Regis Paper Co.
has declared effective its offer of an exchange of stock in the acquisition of Growers Container Corp. of Salinas, Cal. It is planned to operate Growers as a division of St. Regis to continue the manufacture of corrugated shipping containers for fresh fruits, vegetables, beverages, canned goods, frozen foods and industrial commodities. Growers' three plants are located at Salinas and Fullerton, Cal., and Jacksonville, Fla.

Alton Box Board Co.
of Alton, Ill., will build a plant at Tamms for the production of wood chips. Operation is scheduled for early in 1959. The hardwood chips will be transported to the Alton mill for the production of paperboard.

East Texas Pulp & Paper Co.
of Evadale, Texas, has announced the formation of a new converting firm: Precision Carton Co. Inc., to which Eastex has assigned its recently-obtained Ex-Cell-O Pure Pak license. Precision Carton will manufacture milk bottle blanks using Eastex paperboard. The new firm's first plant and general office will be

Complete Service

DESIGN
by our own engineering staff

INSTALLATION
by our own construction crews

MAINTENANCE
by our own service specialists

of Corrosion-Resistant
LININGS and TILE TANKS

Designed and installed to meet the exact chemical and physical requirements of each installation, Stebbins linings and tile tanks are industry-famous for their efficiency and economy.

Wherever you are — whatever your corrosion - resistance problem may be — it will pay you to take advantage of Stebbins' unequalled design experience and installation facilities.

Write for Bulletin A-158

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STEBBINS ENGINEERING CORP. TOWER BLDG., SEATTLE, WASH.
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Specialists in Design, Installation and Servicing of Linings and Tile Tanks

News of the Industry . . .

located on a six-acre tract in Aurora, Ill., and will be equipped with converting machinery supplied by Ex-Cell-O Corp. of Detroit. Production is set for late spring.

Champion Paper & Fibre Co.
of Hamilton, Ohio, has announced the formation of a South American division: Pan American Textil S. A. The new division will operate a pulp mill at Sao Paulo, Brazil, with Robert C. Haynie serving as vice president and general manager. He will continue as vice president of the parent firm in charge of planning.

Great Western Bag Corp.,
a subsidiary of Murray Paper Corp. of Los Angeles, has entered the paper bag-manufacturing field at a converted Studebaker-Packard Corp. assembly plant in the southern California city. The $2,000,000 facility manufactures and distributes paper products for the entire western area. Featured at the 128,000-sq. ft. operation is new Weber & Davis grocery bag-making equipment.

Rap-In-Wax Paper Co.,
Minneapolis producer of flexible packaging, has acquired owership of United Sttates Packaging Corp. of Paterson, N. J., a manufacturer of polyethylene-coated cellophane and Mylar and other pouch materials.

Standard Packaging Corp.
has acquired the assets of Basca Mfg. Co. of Indianapolis, a producer of a complete line of aluminum foil, plastic and paper-foil laminated closures for the dairy industry. The purchase also extends Standard Packaging's Closure Div. into the pharmaceutical bottle industry and the glass industry with foil dust covers. Basca's manufacturing facilities will be moved to Chicago (to be combined with the Closure Div.) and to St. Louis (the Johnston Foil Div.).

Carton Craftsmen Inc.
of Chicago and National Carton Corp. of Joliet, Ill., have announced the merger of the two firms. The combined and expanded folding carton operations will be located in a plant now occupied by Carton Craftsmen in Cicero. The merged firms will operate with the present personnel under the name Carton Craftsmen Inc.

Wrenn Paper Co.
of Middletown, Ohio, is to be merged into Mead Corp. of Dayton subject to the approval of stockholders. It is reported that the transaction will involve more than $3,000,000 and will cover Wrenn's total assets. The latter firm will be operated as a wholly-owned Mead subsidiary.

Flintkote Co.
has arranged to purchase all the assets and the business of Orangeburg Mfg. Co. Inc. subject to the approval of the stockholders of both firms. The transaction is to be through an exchange of stock. The Orangeburg, N. Y. company produces bituminized fiber sewer and drain pipe and fittings, electric conduits for underground power distribution systems and underfloor duct wiring systems. The plant also includes facilities for the manufacture of polyethylene plastic pipe. Orangeburg will be operated as a Flintkote subsidiary while maintaining its identity. No personnel changes are contemplated. . . . In another Flintkote action, directors have approved the merger of Hankins Container Co. November 25 was set as the date for a stockholders' meeting to approve the move. The acquisition will give Flintkote national distribution in the container field. Hankins plants are located in Little Rock, Ark.; Chicago; Elmira, N. Y.; Union, N. J., and Cleveland and Miamisburg, Ohio.

Allied News Notes . . .

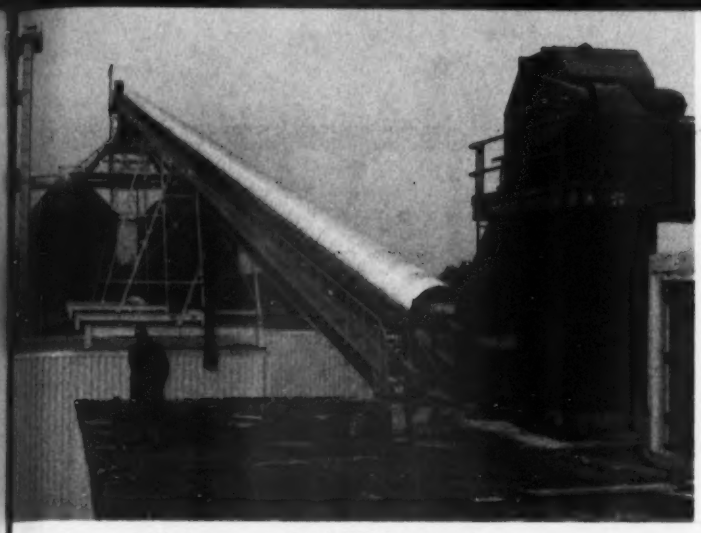
Hanchett Mfg. Co. announces the construction of a new branch office, factory and warehouse in Birmingham, Ala. Complete stocks of all Hanchett products will be maintained at the new branch factory.

Arnold, Hoffman & Co. Inc. has located its Northern sales office at the company's home office in Providence, R. I. Arthur C. Merrill will assume the post of office manager for the sales operation.

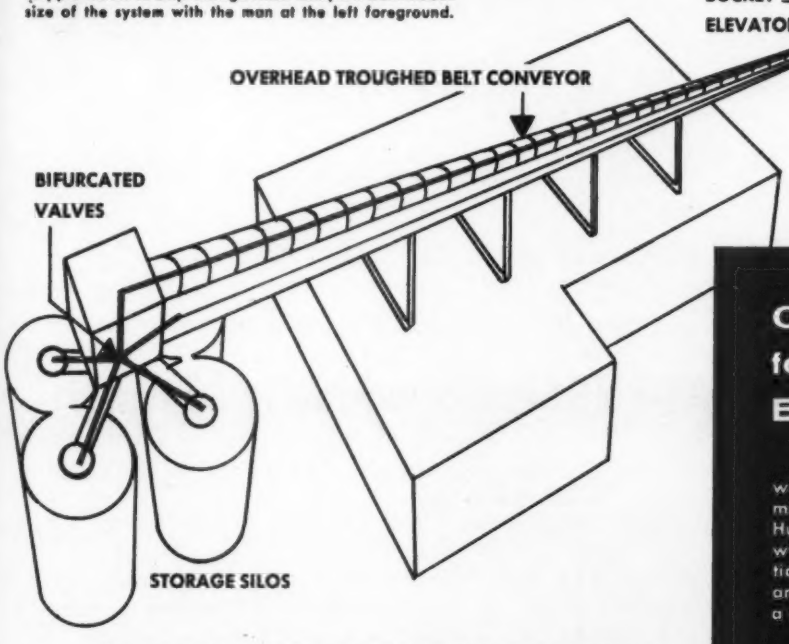
Allis-Chalmers Mfg. Co. has announced plans to acquire **S. Morgan Smith Co. of York Pa.** Both companies plan to complete the transaction as soon as possible, with the hope that Allis-Chalmers can begin to operate the Morgan firm's facilities by the first of this year.

Paper Machinery & Research Inc. has changed its name to **Pamarco Inc.** The company's production will continue to be devoted exclusively to the manufacture of precision quality printing and converting rolls and related services. Pamarco's main plant and general offices are still located in Roselle, N. J.

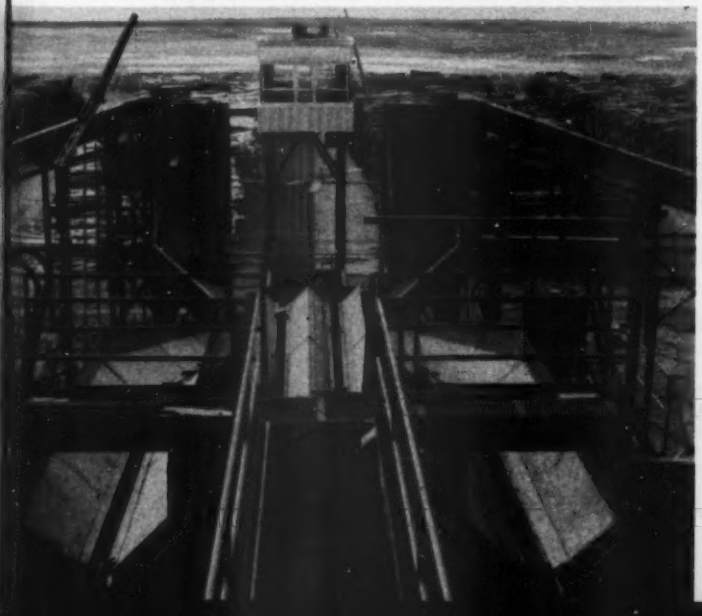
Borden Chemical Co. Div., Borden Co. will construct a polyvinyl alcohol



The covered belt conveyor extends 343 feet from the chipper house to chip storage silos. Compare tremendous size of the system with the man at the left foreground.



The unique fall out stations, lower left and right, prevent jamming by dropping excess logs off the main-line conveyor to be recirculated later.



Only 5 Operators Requ for 1,300 Foot Planet Bulk Handling System

This log handling, barking, chipping and sto was built and installed by Planet Corporation at million dollar hardboard mill constructed on the sh Huron by Stone & Webster for Abitibi Corporation. which has eliminated jamming through a unique tion, makes it possible for 50 cords of logs per hour and stored—ready for pulp processing. The entire s a distance of over 1,300 feet and is operated by o

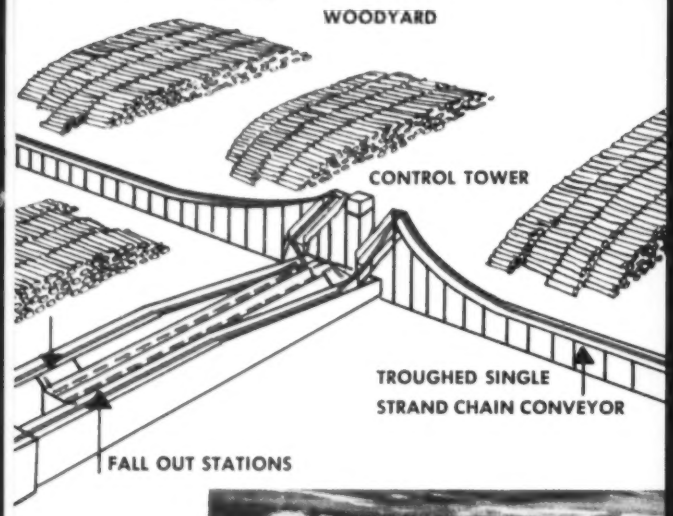
1. Actually, the system, from the woodyard t double. It starts conveying from opposite ends of th with two troughed single strand chain conveyors conveyors carry the eight foot logs from the woody the log wash, fall out stations, inspection stations operation.

2. A unique feature of the system is the fall which prevent jamming by automatically arrang approaching the barkers into single file. This is acco dropping excess logs off the main-line conveyors lating conveyors. These feed the dropped logs b system assuring an uninterrupted flow to the bark

3. After the logs have been debarked, they em dual lines onto a powered spike-roller conveyor to the chipper. This conveyor has a holdback unit jamming in the chipper feed spout. The holdback raises from between the rollers, is manually ope air cylinder.

4. Following chipping, the chips are collecte chipper on a belt conveyor. This conveyor transpo bucket elevator which lifts the chips to the roof o building. From here a long, covered troughed b carries them to the storage silos.

5. The chips can be fed to any one of the four by means of bifurcated valves. From the storage si are fed by rotary plate feeders at a rate of 2,5 per hour onto a system consisting of six belt c delivery to the pulp processing operation.



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HOPPERS

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View of the system from top of the chip storage silos looking down the side of the covered belt conveyor toward the woodyard. Lake Huron is in the background.

IT PAYS TO PLAN WITH PLANET

Here's an example of how Planet's engineering skill and know-how was put to use by one company. No matter what you make, it will pay you to have Planet Corporation on your team when you have a materials handling or automation problem to solve.

Planet Corporation is completely staffed with qualified and experienced graduate engineers. They will give your problem painstaking attention from preliminary surveys, engineering and design to installation and field testing.

Write or phone today to have a Planet sales engineer discuss with you the solution to your problem. There's no obligation, of course.

PLANET CORPORATION

- ENGINEERED HANDLING SYSTEMS
- AUTOMATION EQUIPMENT
- FOUNDRY HANDLING EQUIPMENT

1826 SUNSET AVENUE LANSING, MICHIGAN

TO SOLVE ABITIBI'S BULK HANDLING PROBLEM, PLANET ENGINEERS OUTDID PAUL BUNYAN

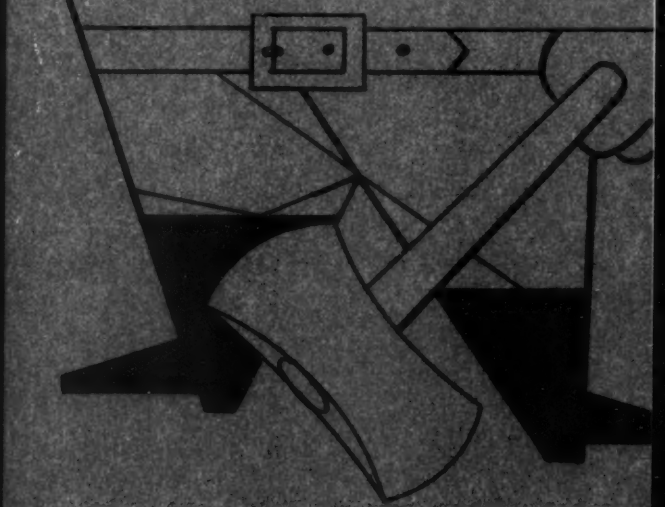
...gigantic system delivers 50 cords of pulpwood per hour

Abitibi Corporation wanted a log conveying system. It had to deliver 50 cords of pulpwood per hour from woodyard through barkers, and chipper to chip storage silos . . . and the old bugaboo of jamming had to be eliminated!

Planet engineers combined systematic, logical procedure with creative engineering to bring Paul Bunyan . . . and his blue ox Babe . . . back to northern Michigan in the form of a gigantic bulk handling system. For the interesting details of the "Paul Bunyan" that was developed, look to the left and under this flap.

The Planet staff is well qualified to solve your materials (either bulk or unit) handling or automation problems. Its experience and know-how has been gained in creating complex engineered systems for many of the country's largest companies.

It paid Abitibi to "Plan With Planet" . . . it will pay your company too. Write or phone today.



PLANET CORPORATION

- ENGINEERED HANDLING SYSTEMS
- AUTOMATION EQUIPMENT
- FOUNDRY HANDLING EQUIPMENT

1826 SUNSET AVENUE LANSING, MICHIGAN

JAGENBERG

JAGENBERG Synchro-Fly Cutter Model 'DQSM GI' in a German mill, with hydraulic stack equalizing device and slat type conveyor, designed for continuous operation from 80" diameter rolls.

Introducing a new principle, well tried and proven abroad

The JAGENBERG Synchro-Fly® Sheeter

- handling toughest board up to a basis weight of 1,850 Lbs/3,000 sq. ft., or caliper .150 (single web) with unrivalled accuracy,
- ensuring clean cut and right angled edges free from fluff and ridging even on high calipers.
- In connection with board machines, JAGENBERG's Single and Duplex Cutters provide for changing both slitter and cutter sizes during full operation; deflector for defective sheets, minimum waste.
- When used as a separate cutter (off the machine), continuous operation can be provided with the aid of brake generators, automatic web tension and edge controls, automatic web feed during roll changes.
- Automatic sheet squaring.
- All driving components enclosed in oil bath gear boxes in the side frames.
- Due to genuine shear cutting action, fly knives stay sharp for up to 3 years without regrinding.

These and more outstanding advantages are offered by the JAGENBERG Synchro-Fly.

® JAGENBERG trade mark for two rotary fly knives synchronized with web speed during the cut.

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In Canada:
Jagenberg of Canada Ltd., 388 Yonge St., Toronto 1, Ont.

plant. This plant will adjoin the company's present plant at Leominster, Mass.

ORIGINAL BUILDING of Appleton Machine Co. at Appleton, Wis., as it appeared in 1883. The firm is currently celebrating its diamond anniversary and has adopted the slogan, "75 Years of Progress Through Specialization". Since the end of World War II Appleton Machine has produced nearly $40,000,000 worth of supercalenders (about 70 per cent of all those made in the United States).

Coming Events

Tappi

January 20—Pacific Section, Aberdeen, Wash.

January 22—Northwestern Division, Elks Lodge, Menasha, Wis.

February 23-26—National Meeting, Hotel Commodore, New York.

March 9—New England Section, Greater Boston area.

Superintendents Association

January 27—Miami Valley Division, Hotel Manchester, Middletown, Ohio.

February 12—Michigan Division, Hotel Harris, Kalamazoo, Mich.

March 19—Michigan Division, Imman's Restaurant, Galesburg, Mich.

Other meetings

January 20 & 27—February 3 & 10—Central Paper Co's 1st Paper Seminar. Held each Tuesday at Hotel Douglas, Newark, N. J.

January 26-29—Plant Maintenance & Engineering Show, Public Auditorium, Cleveland.

January 26-29—Fourteenth International Heating & Air-Conditioning Exposition, Convention Hall, Philadelphia.

January 26-February 5—Annual short course in Quality Control by Statistical Methods, College of Engineering, University of Illinois, Urbana, Ill.

January 28-30—Technical Section, Canadian Pulp & Paper Association, Hotel Queen Elizabeth, Montreal, P. Q.

January 31—Wisconsin Paper Group's 25th anniversary annual meeting, North Shore Golf Club, Menasha, Wis.

March 16-20—Fifteenth Annual NACE Conference and 1959 Corrosion Show, Sherman Hotel, Chicago.

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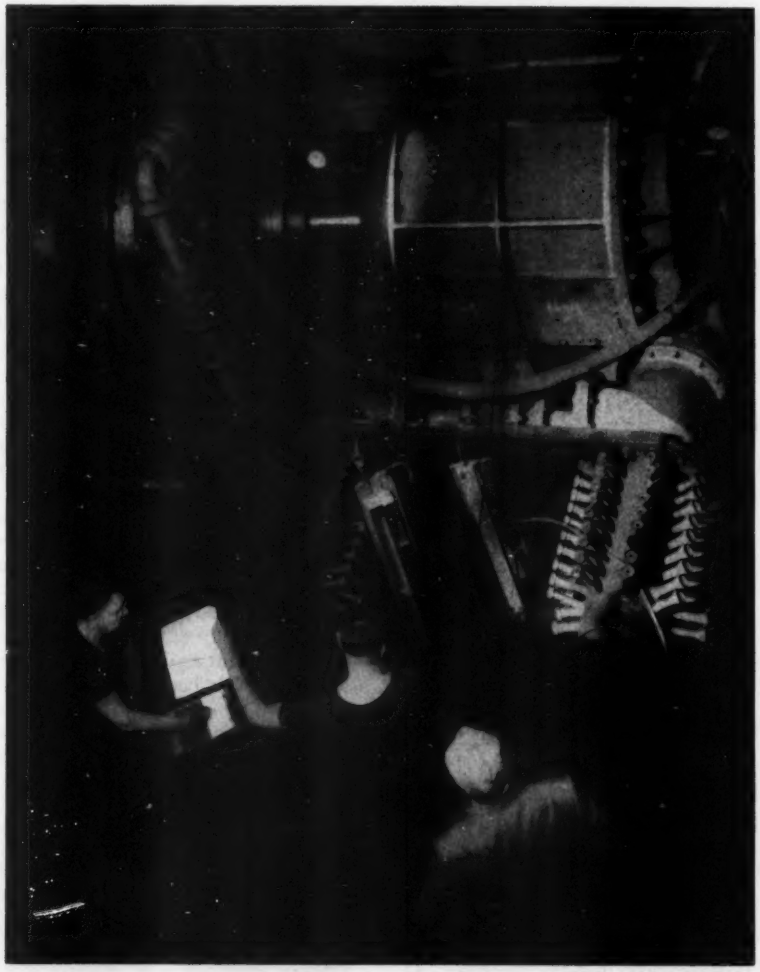

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NAMES *in the* NEWS

Clifford Skinner

Thomas Flanagan

KVP Vet to Retire

Clifford Skinner, superintendent of the Wax Div. of KVP Co. at Kalamazoo, Mich., will retire March 1 after 36 years with the firm.

Succeeding Skinner will be Thomas Flanagan, who was recently promoted from the post of assistant superintendent of the Printing Div. to that of assistant superintendent of the Wax Div.

Beginning his career with KVP as a helper on a wax machine, Skinner was made division superintendent in 1948.

Flanagan joined the Kalamazoo firm as a laboratory chemist. He was later transferred to the Espanola, Ont. mill and in 1955 returned to the Parchment, Mich. plant as technical assistant to the manager of manufacturing.

In another KVP promotion Aarend Stoppelberg becomes assistant to the Printing Div. superintendent. He joined the company staff in that division in 1945.

Harrison Named President of Allied

Ward D. Harrison has been elected president of Allied Paper Corp. and the chief executive officer of its division in Kalamazoo, Mich.

In his second term as president of Tappi, Harrison was formerly vice president and general manager of Riegel Paper Corp. While still a student Harrison was associated with Crown Zellerbach Corp. and was for seven years on the staff of Ecusta Paper Corp., where he became assistant general manager.

The new Allied president is a director of the Pulp & Paper Foundation at North Carolina State College and holds a similar position at the University of Maine, in addition to his long years of service with Tappi.

An authority on many phases of paper manufacture, Harrison has been particularly interested in the drying of paper; the control of pulping and bleaching by the use disperse viscosity; bleaching with chlorine dioxide; the manufacture of semichemical pulp, and flotation saveall operations.

Caddoo Named VP

William H. Caddoo, general manager of the Gair Boxboard & Folding Carton Div. of Continental Can Co., has been elected a vice president of the firm. He joined Robert Gair in 1933 as a chemist at the Haverhill, Mass. paperboard mill and served successively as technical director of the firm, plant manager and assistant to the vice president. He became a vice president in 1954 and in 1956, when Gair was merged into Continental Can, was made general manager of manufacturing in the Gair Div.

W. H. Caddoo

James Evans

Mead Promotes Evans

James S. Evans has been named mill manager of Wrenn Paper Co. at Middletown, Ohio (a wholly-owned subsidiary of Mead Corp.).

Evans was formerly director of production-quality control at Mead's Kingsport, Tenn., Div. He joined Mead in 1946 as an engineering trainee and later was transferred to research and development until 1953, when he became assistant technical director at the Kingsport mill.

James Ozias

Robert Beckett

Oxford Promotes Two

Two mill executives have been promoted at the Oxford Miami Div. of Oxford Paper Co., West Carrollton, Ohio.

Robert E. Beckett, general superintendent of the Miami Div., has been promoted to the position of paper manufacturing assistant to the mill manager. He will now work closely with the mill engineering department in design and planning. He will also function in an advisory capacity on paper manufacturing matters. Beckett joined Oxford Miami in 1915 and was named general superintendent in 1943.

It was also announced that James H. Ozias, assistant general superintendent, was promoted to general superintendent of Oxford Miami. He will now have operating and administrative responsibility and control over the production organization and facilities at this Division. Ozias joined Oxford in 1946 and was named assistant general superintendent in 1955.

C. D. Weyerhaeuser has retired as vice president in charge of the forestry, lands and timber department of Weyerhaeuser Timber Co. after more than 25 years of service to the firm. He continues as a director. Weyerhaeuser is being succeeded by **Edwin F. Heacox**, formerly managing forester, who joined the firm in 1930 and was at one time branch forester at Longview, Wash.

J. R. Kimberly of Kimberly-Clark Corp., Neenah, Wis., has been elected to a three-year term as trustee of American Forest Products Industries Inc.

Gowan J. Miller has been appointed to the newly-created position of personnel director at the Institute of Paper Chemistry, Appleton, Wis.

Reelected a vice president of American Forest Products Industries Inc. at a recent annual meeting was **John H. Hinman,** board chairman of International Paper Co. Trustees elected for three-year terms included: **William Hilton,** vice president and manager of woodlands for Great Northern Paper Co.; **J. R. Kimberly,** board chairman and president of Kimberly-Clark Corp.; **James T. Sheehy,** executive vice president of Rayonier Inc.; **D. F. Morris,** president of Mead Corp.; **G. W. E. Nicholson,** president of Tennessee River Pulp & Paper Co., and **R. W. Wortham Jr.,** executive vice president of Southland Paper Mills Inc.

Milprint Inc. has announced a top-level executive realignment: **William Heller Sr.** has been named honorary chairman. A co-founder of the firm at the turn of the century and chairman since 1950, he will continue active in an advisory capacity. Elected chairman and chief executive officer was **Roland N. Ewens,** who joined the firm in 1932 and has been president since 1950. Succeeding Ewens as president is **Arthur Snapper,** executive vice president since 1950.

H. C. Lange, formerly executive vice president, has been elected president of Weston Paper & Mfg. Co. of Dayton, Ohio. He succeeds **Ward S. Hubbard,** who was named chairman of the board.

Allied Personalities

Roy L. Creamer Jr. has been appointed district manager in charge of the new district sales office of Clinton Corn Processing Co., Clinton, Iowa. This sales office is located in St. Louis, Mo. Creamer has been with Clinton as a sales representative in the Kansas City district for the past 11 years.

W. B. Gillette and Bryan W. Guess have been named assistant sales managers for Texas Gulf Co. Inc., New York.

E. L. Mills, who has been district sales engineer in Pittsburgh for Link-Belt Co., has now been appointed district manager of Link-Belt's Duluth district office. He replaces **R. P. Sayers** who is being advanced to the Chicago district sales office.

Howard W. Edminster has been appointed sales engineer by John W. Bolton & Sons Inc. and the Emerson Mfg. Co. Div. He will handle sales of pulp and paper mill machinery and equipment made by Bolton and Emerson in the southeastern territory.

William V. Cross has been named product manager of the process antifoam department by National Aluminate Corp., Chicago. He will manage sales and technical service activity on antifoams for the Industrial Div.

Frank Nerney has been promoted to manager of the newly-created southeastern sales territory for the Becco Chemical Div. of Food Machinery and Chemical Corp., Buffalo, N. Y. This territory covers Georgia, Alabama, Mississippi, the central part of Tennessee and Northern Flordia.

Gilbert H. Van Schaik officially assumed the duties of manager at the Chicago district office for Whiting Corp., Harvey Ill. He was formerly sales engineer at the Chicago office and now succeeds the retired **R. S. Hammond.** Another appointment of Whiting Corp. was **Harrison Taylor,** former assistant district manager of the New York District. He will become manager of the St. Louis District office succeeding the retired **Frank P. Walsh.**

Necrology . . .

R. H. Scanlon

R. H. Scanlon, senior director of Powell River Co. Ltd. died in November.

Scanlon, the son of the late M. J. Scanlon (founder of the Powell River Co.), was a prominent pioneer in the Canadian paper industry.

He joined Powell River in 1910 during the construction of the original townsite and the first paper machine. After serving as labour, safety supervisor, townsite manager and assistant resident manager at Powell, he was then appointed as the first sales representative in California in 1931.

In the middle thirties, he retired from active service with the company and entered private business as a partner in the financial house of Stuart-Scanlon in San Francisco.

Frank S. McNeil

Frank S. McNeil, 58, vice president and sales manager of the Niagara Envelope Mfg. Inc., Buffalo, N. Y., died in November.

McNeil joined Niagara Envelope in 1946. He had been in the envelope business in Buffalo for the last 38 years.

William H. Enell

William H. Enell,, director of advertising and public relations for Paterson Parchment Paper Co. at Bristol, Penn. died in November.

Enell has been with Paterson since 1927 and was very active in many affairs of the paper business.

Speed Warren

Speed Warren, 88, semi-retired executive of Mead Corp. at Dayton, Ohio, died in December.

Warren joined the Mead Corp. in 1917 as treasurer. He was elected vice president in 1942 and served in that post until 1950. In semi-retirement since, he was associated with the firm as a financial consultant.

Arthur F. Bass, 65 retired assistant superintendent of Standard Paper Co. Inc. in Richmond, Va., died in November.

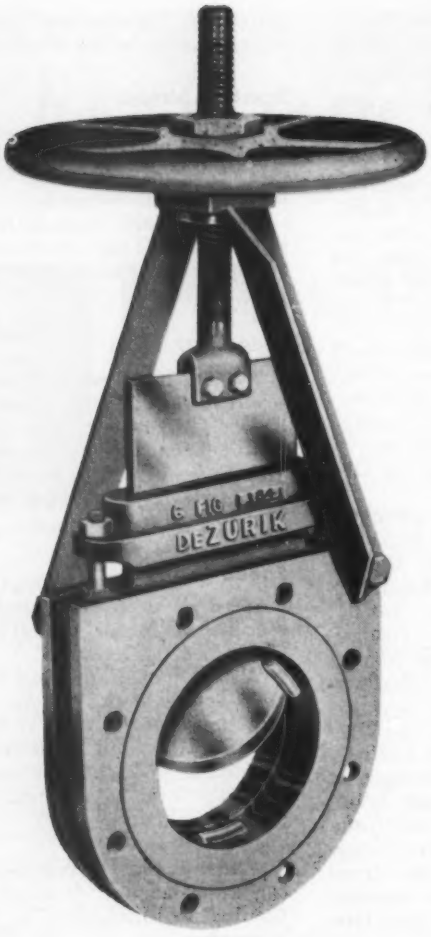
Bass had retired from Standard Paper in 1956 after 34 years of service.

Ralph M. Kingsbury, 56, research chemist at the U.S. Forest Products Laboratory, died in November at Madison, Wis.

When Kingsbury joined the Laboratory's pulp and paper division in 1943, he was responsible for much of the work in pulp bleaching and purification and in the development of new and improved bleaching processes—especially those for groundwood, semichemical and other high-yield pulps from hardwoods.

Kingsbury was also author of numerous publications in the field of bleaching pulps for papermaking and chemical derivatives.

George H. Richards, a senior vice president and a director of Celanese Corp. of America, died recently in Montreal while on a business trip. He was 57. A native of Scotland, Richards joined the staff of the old Celluloid Corp. in 1932 and was secretary-treasurer when that firm was merged into Celanese Corp. in 1941.



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PATENT REVIEWS

MELVIN NORD*

Recovery of chemicals from smelt solutions

U.S. 2,841,561, issued July 1, 1958, to Kenneth R. Gray, Hartzell L. Crosby and John C. Steinberg and assigned to Rayonier Inc., relates to the production of wood pulp and has as its object the provision of an improved process for the treatment of smelt solutions containing sodium sulfide.

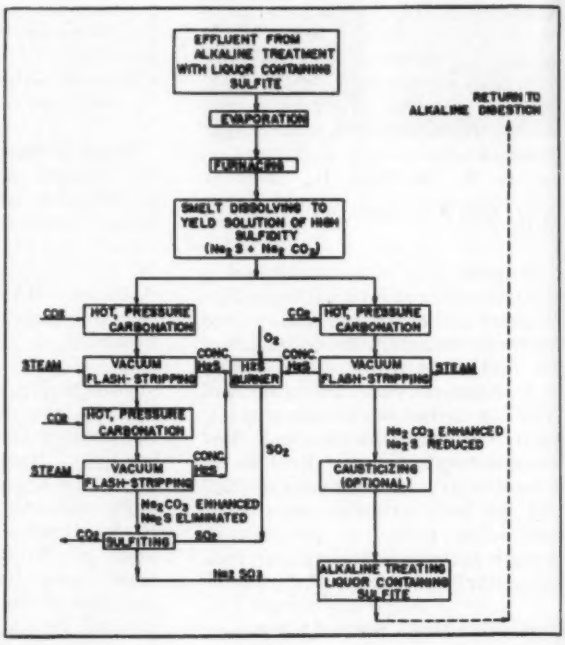

Fig. 1

As shown in Fig. 1, waste effluent from a treatment with a liquor containing sodium sulfite is subjected to evaporation and then to furnacing to produce a smelt containing a substantial proportion of sodium sulfide. This smelt, which is now a high-sulfidity smelt, is dissolved in water to form a smelt solution containing sodium sulfide and sodium carbonate.

The solution is divided into two parts. One part is subjected to a number of carbonation treatments — each of which is followed by flash-stripping for the purpose of eliminating sodium sulfide and the enhancement of the sodium carbonate content of the solution. Hydrogen sulfide is released and is recoverable in concentrated form. The resulting effluent solution is then treated with sulfur dioxide, preferably obtained by burning the hydrogen sulfide, resulting in the liberation of carbon dioxide and the formation of sodium sulfite.

The other portion of the smelt solution is subjected to a single stage of carbonation and flash-stripping for the elimination of a part of the hydrogen sulfide, the reduction of the sodium sulfide content and an enhancement of the sodium carbonate. The resulting effluent solution can be combined with the sodium sulfite-containing liquor to form an alkaline treating liquor containing sodium sulfite for return to the pulping operation.

Apparatus for testing the structure of a moving sheet of paper

U.S. 2,844,068, issued July 22, 1958, to David J. Williams and assigned to Australian Paper Manufacturers Ltd., describes an

*Patent attorney, 17600 Pinehurst, Detroit 21.

apparatus for indicating and recording the formation or structure of a moving sheet of paper during its manufacture.

The apparatus includes a light source for projecting a beam of light through the sheet of paper and light-sensitive photoelectric and electronic means for continuously recording the variations in transparency of the paper.

Separation of lignosulfonic acids

U. S. 2,838,483, issued June 10, 1958, to Leif Jantzen and assigned to Arthur C. Trask Co., relates to the separation of lignosulfonic acids obtained from sulfite liquor.

Sulfite liquor from the pulp digester is contacted with finely-divided chrome-tanned hide for a time sufficient for the high-molecular weight alpha acids to combine chemically with the tanned hide. The chemically-combined alpha acids are then removed by washing the tanned hide with an aqueous alkali solution. This separates the acids from the tanned hide in the form of salts and produces hydroxyl groups in the tanned hide.

The treated liquid from which the alpha acids have been removed is then again contacted with the treated hide for a time sufficent to react substantially all the beta low-molecular weight acids with the tanned hide by washing with an aqueous alkali soution. Again the beta acids are removed in the form of a salt.

The tanned hide is then returned to a condition chemically for reuse in separating alpha and beta acids by washing with an aqueous acid solution.

The reaction appears to be one of ion exchange. The alpha acids replace any other acid with a lower molecular weight that may be connected to the basic groups of the tanned hide.

Digestion apparatus

U.S. 2,845,347, issued July 29, 1958, to Hugh J. Byrne, describes a method and apparatus for the digestion of wood fibers for the production of pulp.

The cooking liquor is strained through a screen located beneath the surface of the body of cooking liquor in the digestion vessel. Adjacent to the screen a jet of steam is projected into the mass of fibrous material — thus effecting the heating of the liquor and the agitation of the fibrous material adjacent to the screen.

Reverse roll coating machine

U.S. 2,842,092 issued July 8, 1958, to Anthony W. Pompe and assigned to John Waldron Corp., describes a method and apparatus for web coating by the so-called roll transfer process, in which there is less penetration of the web.

Normally in reverse roll coaters the web to be coated is drawn along the surface of the transfer roll to pick up its layer of coating material by means of a resilient backing roll, insuring contact throughout the full width of the web material at relatively uniform pressure in spite of slight inequalities in web thickness and uniformity.

Such machines, however, have the disadvantage of "strike through", or penetration of the web, leaving unsightly splotches on the back face of the web. The cause of this "strike through" is apparently the acute angle occurring between the surface of the web leaving the transfer roll after picking up its coating and the corresponding and coated surface of this roll, which subjects the web material to a continuous pressure of coating material for too long a time and over too long a space, especially since the material and the transfer roll are travelling in opposite directions, so that the first wipes coating from the other.

The present invention solves this problem by eliminating the resilient backing roll entirely and substituting a doctor blade in its place at a sharp angle to the transfer roll. The web is trained over the edge of the doctor blade and is thus brought against the transfer roll almost at a single point, entering and leaving the transfer roll at relatively large angles.

Aqueous solution for fireproofing paper

U.S. 2,842,510, issued July 8, 1958, to James A. Robertson and assigned to E.I. du Pont de Nemours & Co. Inc., discloses a method of making flame-resistant paper in such a manner that it is no stiffer than ordinary paper.

An aqueous impregnating solution is used containing the uncured form of a thermosetting resin, an oxyfluoborate and a plasti-

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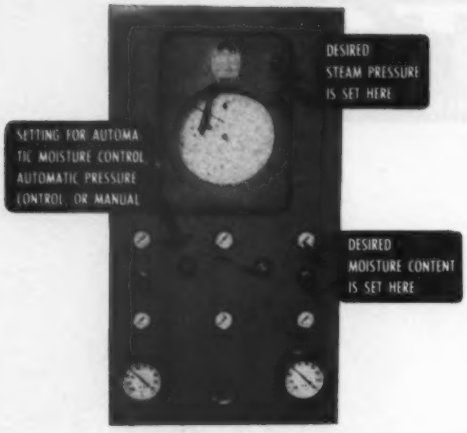

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4. Maintains desired steam pressure in dryers when paper is off the machine for start-up, wash-up, or wet end breaks. When break occurs, "electric eye" control shuts off steam or maintains steam pressure at preset level; restores proper moisture content up to 8 times faster than other controls.

5. Provides convenient adjustment and monitoring, with all controls and instruments located in one panel as shown above. No hydraulic pistons, chains, pulleys or weights.

6. Eliminates hand adjustment except where slight changes are desired for sharper control.

7. Reduces steam consumption because it admits only enough steam to maintain required moisture content.

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Patent Reviews . . .

cizer(a water-soluble polyhydric alcohol or a water-soluble polyethylene glycol).

A preferred composition of the oxyfluoborate is $4NaF, 5B_2O_3$ or its pentahydrate. About 5-15 per cent by weight of this substance is used.

The preferred thermosetting resin is phenol-formaldehyde.

Production of pith-free paper pulp from bagasse

U. S. 2,839,398, issued June 17, 1958, to Harold D. Stuck and assigned to Process Evaluation & Development Corp., describes a process for the manufacture of paper-grade pulp from bagasse and the stalks of similar pithy plants.

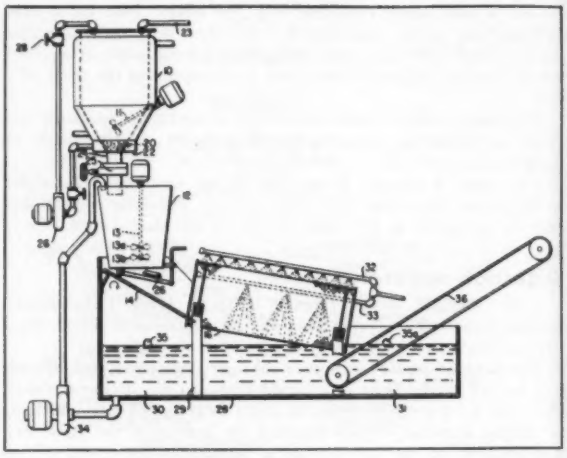


Fig. 2

Suitable apparatus for carrying out the pre-treatment operation of this invention is shown in Fig. 2 and consists mainly of a steam-jacketed reactor 10 having a propeller mixer 11, an agitator 12 equipped with a high-speed mixer 13, a gyratory screen 14 for draining the solids from the slurry from the agitator and a classifying screen 16. These units are mounted for gravity flow from one unit to the next and are equipped for the recycle of all or part of the various solutions encountered in the process.

The bagasse and an aqueous solution containing about 1.5 per cent by weight of enzyme are fed continuously into the reactor 10 in the ratio of 600 gal. of solution to 1000 lb. of dry bagasse. A suitable commercial enzyme preparation that has been used includes Rhozyme DX, manufactured by Rohm & Haas Co., Philadelphia, Pa., and described by the manufacturer as a diastatic enzyme preparation which is characterized by its strong starch-liquifying (alpha-amylase) activity.

Steam is admitted to the steam jacket of the reactor 10 to maintain the temperature of the mixture at about 75°C, and the discharge valve is adjusted to allow the mixture to pass through the reactor in about 15 min. Agitation and thorough mixing of the contents are maintained by the mixer 11.

As the mixture discharges from the bottom of the reactor, about 60-75 per cent of the enzyme solution is withdrawn through the perforations 20 and annular channel 22, recycled into the reactor through the pump 26, and then additional make-up enzyme solution is added through the make-up conduit 23 to maintain the proper proportions of enzyme solution as additional bagasse is added.

The mixture then passes into the agitator 12, together with sufficient hot water to form a thin slurry; conveniently recycled water is subsequently drained from the effluent from the agitator and heated to about 50°C in an amount to provide a slurry ratio of about 100 gal. of solution per 1000 lb. of dry bagasse. The discharge from the agitator is controlled through the valve plug 26 to hold the mixture in the agitator for about 2 to 5 min.,

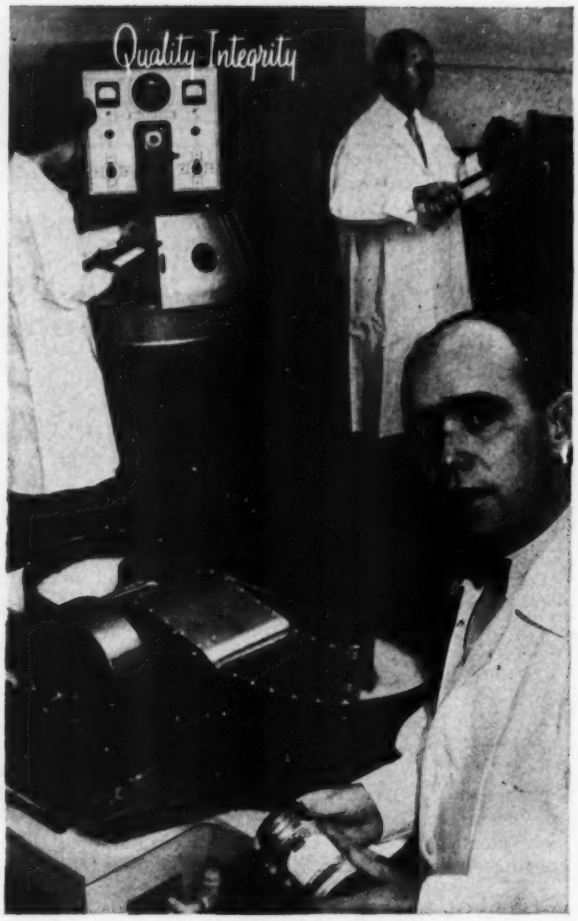
during which time the contents are violently agitated to loosen the pith cells by the high-speed propeller mixer 13.

From the agitator 12 the mixture flows onto the gyratory screen 14, which filters out the solids and delivers them to the rotary screen classifier 16, while the liquid fraction drains into the drainage reservoir 30, from which the required fraction to be returned to the agitator is withdrawn by the pump 34 and heated by conventional means.

In the rotary screen classifier the mixture is copiously showered with water from both inside and outside the rotating screen from the shower tubes 32 and 33. This pith is thereby washed through the meshes into the pith-collecting reservoir 31, while pith-free fiber bundles are washed along the inclined screen and discharged from its lower end onto the elevator 36 and carried to the digestor.

Other Patents of Interest to the Pulp and Paper Industry

Subject	Inventor or Assignee	Patent No.	Date
Fiber molding apparatus	Deutsche Fibril Gesellschaft m. b. H.	2,841,054	7/1/58
Paper edge flaring machine	Lee D. Hincher	2,841,056	"
Rotary dewaxer for coated paper	E. G. Staude Mfg. Co. Inc.	2,841,112	"
Log debarking machine	Oscar R. Fulghum	2,841,195	"
Paper box folding machine	International Paper Box Machine Co.	2,841,270	"
Paint brush wrapper	U. S. Envelope Co.	2,841,273	"
Combination dispensing and disposal device	David Schwimmer et al	2,841,276	"
Windshield shipping carton assembly	Richard E. Paige	2,841,277	"
Paperboard wrapper with handle	Mead-Atlanta Paper Co.	2,841,279	"
Foldable paperboard box	Mary E. Frasch	2,941,318	"
Shipping container for produce	Lawrence Paper Co.	2,841,319	"
Collapsible cartons	John F. Currivan	2,841,320	"
Manufacture of alkali cellulose pulp sheets	Canadian International Paper Co.	2,841.580	"
Closures for flexible-walled containers	Bemis Bro. Bag Co.	2,842,179	7/8/58
Supporting box for fragile articles	Societe d'Application Technique d'Emballages, Modernes	2,842 263	"
Bottle carriers	Waldorf Paper Products Co.	2,842,288	"
Pouring spout carton	Chicago Carton Co.	2,842,302	"
Set-up box	United Paper Box Co. Inc.	2,842,303	"
Shipping and carrying cartons	Diamond Match Co	2,842 304	"
Cartons	Northwestern Corrugated Box Co.	2,843,257	7/15/58
Commodity wrapper and package	Fort Orange Paper Co.	2,843,259	"
Feeding wood into grinders for the production of pulp	Tor G. Qveflander	2,843,278	"
Molded pulp carton lock	Diamond Gardner Corp.	2,843.304	"
Thick-sided box	Chester G. Myers	2,843,305	"
Cigar box formed from a flat blank	Autokraft Box Corp.	2,843.306	"
Box construction	Joseph Goltz	2.843.307	"
Double-walled container	Richard E. Paige	2 843,309	"
Molded pulp pear tray	Diamond Gardner Corp.	2,843,496	"
Apparatus for treating impregnated webs	Wood Conversion Co.	2,843,505	"
Machine for forming and applying cord handles to a paper bag web	Equitable Paper Bag Co. Inc.	,2,844,075	7/22/58
Carton-forming apparatus	Food Machinery & Chemical Corp.	2,844,076	"
Box-forming machine	Fraser Label Co.	2,844,077	"
Folding machine for the manufacture of paperboard boxes	Continental Can Co. Inc.	2 844,078	"
Carton attachment to a container	Central Carton Co.	2,844,245	"
Egg packing material	Central Fibre Products Co.	2,844.268	"
Multi-celled article carriers	Diamond Gardner Corp.	2,844,280-1	"
Cellular bottle carrier	Karry-All Inc.	2,844,282	"
Corner construction for a chick box	New England Wooden Ware Corp.	2,844,293	"
Chick carton	Old Dominion Box Co. Inc.	2,844,294	"
Boxes	Northwestern Corrugated Box Co.	2,844,295	"
Lock bottom for paperboard container	Stone Container Corp.	2,844,296	"
Collapsible carton	Bloomer Bros. Co.	2,844,297	"
Beverage cooler carton	Pabst Brewing Co.	2,844,299	"
Sliced meat package	Waldorf Paper Products Co.	2,844,300	"
Carton-closing apparatus	Waldorf Paper Products Co.	2,844,930	7/29/58
Fiberboard container	Inland Container Corp.	2,845,211	"



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SAFETY NEWS

Mills Report Continued Downward Trend in NSC Contest

FOR THE NINE MONTHS ended September 30 some 121 contestants reported perfect scores in the 1958 Paper Industry Safety Contest sponsored by the National Safety Council. The number of mills reporting stands at 676.

Last year's nine-month record was 86 perfect scores in a "field" of 597.

The January-September frequency rate for all divisions (except pulpwood logging) was 6.97, a 1-per cent decrease from the same period in 1957. In the Pulp & Paper Div. the nine-month rate was 6.52, a decrease of 3 per cent from a year ago. In Paper Converting a rate of 8.02 meant a 1-per cent increase from the first nine months of 1957. Pulpwood Logging reported a rate of 36.28—down 58 per cent from last year.

Contestants working the most manhours in the January-September period without lost-time accidents were: Marinette Paper Co. (a subsidiary of Scott Paper Co.), Marinette, Wis.; Escanaba Paper Co. (a subsidiary of Mead Corp.), Escanaba, Mich., and Michigan Carton Co., Battle Creek, Mich.

From the eligible mills in Division I the board of judges will choose the mill with the most outstanding record. This plant will be awarded the grand prize—the Edward Benton Fritz Memorial Trophy—during the National Safety Congress in October. The trophy is presented each year by Fritz Publications Inc., publisher of THE PAPER INDUSTRY.

POWELL RIVER CO. LTD. has won the Centennial Safety Award sponsored by the British Columbia Department of Labor. During the presentation program R. M. Cooper (r), Powell River vice president, is congratulated by the Hon. Lyle Wicks, provincial labor minister. In achieving the safety honor the Powell River, B. C. plant operated 76 consecutive days without a lost-time accident for a total of 97,000 man-days.

PUT ACTION IN YOUR SAFETY PROGRAM

Add a touch of showmanship to your safety program. Films let you tell your training story with the dramatic impact of pictures . . . action . . . sound. You can cut your safety training in half, give fewer refresher courses and get better results by using training films.

Here are three film sets that will help you arouse and keep alive interest in your safety program. And there is no better way to teach foremen how to be better supervisors.

SPEAKING OF SAFETY

A brand new set of films that will teach your foremen and supervisors the tips they should know about making safety talks, and how to transmit management's ideas and plans. Six 35mm sound slidefilms and leader's manual in an attractive leatherette case.

HUMAN FACTORS IN SAFETY

This is a series of six 35mm sound slidefilms with leader's manual that may be used for an advanced safety course. Each film deals with one aspect of the complex art of handling people. Collectively, the films show how to train workers, how to keep experienced people on their toes and how to win respect, cooperation and loyal support.

SAFETY MANAGEMENT FOR FOREMEN

A set of ten 35mm sound slidefilms—all that is needed for a course in safety fundamentals. The films explain how to organize a safety program, what part the foreman plays in the program and how safety increases production. They also discuss specific safety activities, such as machine guarding, safety inspections, the first aid program, etc. Complete with leader's manual in an attractive leatherette case.

Write for complete information and details to the

NATIONAL SAFETY COUNCIL

425 North Michigan Ave., Chicago 11, Illinois

NEW PRODUCTS

These items are numbered for your convenience. Further information on the various products described may be requested at no obligation through our Readers' Service Dept. Use the business reply card in this issue.

Paper filler

Called fibrous potassium titanate, a new product has been developed that is composed of a compact mass of crystalline fibers that give a talic-like feel.

This product was originally developed for insulating applications, but the company has stated that it can be used as a paper filler. *E. I. du Pont de Nemours & Co. Inc.*

Circle No. 11 on Readers' Service Card

Teflon-jacketed steel thermowells

Teflon-jacketed steel thermowells (known as Type S) combine optimum heat transfer, corrosion resistance, strength and economy. They are said to withstand continuous immersion in all dilute acids, except hydrofluoric, at temperatures up to 350°F.

The thermowells are available in ½-, 1- and 1½-in. schedule 40 carbon steel pipe sizes with a 1/16-in. thick jacket of high density, non-porous Teflon which extends over the back face of the mounting flange to form a protective seal. *Resistoflex Corp.*

Circle No. 12 on Readers' Service Card

Indicating dial thermometers

A completely redesigned line of indicating dial thermometers for measuring temperatures in the range of −350°F to +1000°F has been announced.

Tradenamed as Supertherm, the line is complete in variations offered as to: remote or direct reading types; methods of ambient temperature compensation, where required; filling mediums for different temperature ranges and uses; case sizes, materials and styles; thermometer bulbs of different sizes, shapes, and materials to suit

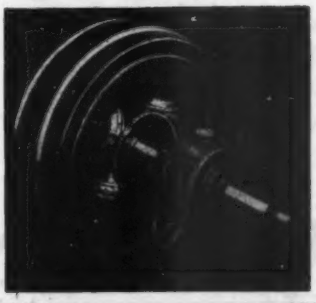
Plates and chipper knives

Hardened O-KNI-CO wear plates for chippers to be used in conjunction with hardened O-KNI-CO chipper knives are now available on all chippers made by D. J. Murray Mfg. Co.

This combination is said to eliminate breakage, increase service life and produce continuous production of uniform chips. *Ohio Knife Co.*

Circle No. 13 on Readers' Service Card

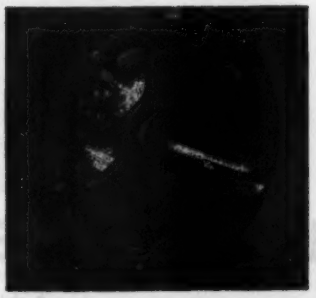
STOP TELESCOPING ROLLS • MUSHROOMING CORES



Use HORTON Clutches and Brakes to control the sheet tension on your center winders and back stands. Take the guess work out of tensioning and let Horton equipment give you uniform good rolls all the time.

VARIABLE SPEED CLUTCH PULLEYS
GOVERNOR CONTROLLED BRAKES

HORTON MFG. CO., INC.
MINNEAPOLIS 14, MINNESOTA



Building the skill of experience into

LODDING DOCTORS...

Allen Foley has punched more holes in doctor blades than anyone around the Lodding plant can estimate. His are the final stages in the making of Lodding Blades — punching and setting pins, buttons and springs. Like every other step in their production, the precision which results from experience makes a close-fitting blade, easy to install and remove, and guarantees satisfactory doctoring.

The high performance which everyone expects and receives from Lodding Doctors is the result of the care and experience of the team producing them. This is an asset which only comes in specializing in doctors over the years.

During the last ten years, Lodding has made more than 10,000 doctors, 17,000 blade holders and 350,000 blades. Lodding shares this experience with you.

LODDING ENGINEERING CORPORATION

AUBURN, MASSACHUSETTS

New Products . . .

application needs. *U. S. Gauge Div. American Machine & Metals Inc.*

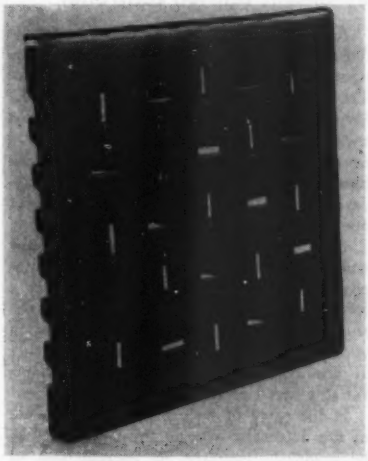
Circle No. 14 on Readers' Service Card

Chemical treatment for felt

A new chemical treatment called HUY-5 has been developed especially to improve performance and increase service life of felts running high brightness board and market pulp. This new, all-purpose, natural color treatment gives felts outstanding resistance to wear, bacterial and chemical attack, shrinkage or felting, changes in running size and hair shedding.

Reports received from mills producing food board, pulp, white patent coated and coated, bristol and mounting board, bleached manila and bleached tag stock, prove conclusively that the the new treatment is making a major contribution to increased production, improved product quality and lower felt cost. *F. C. Huyck & Sons.*

Circle No. 15 on Readers' Service Card



Steel flooring

The illustration above shows the Stelcon Anchor Plate. These plates are made of steel for use in industrial floor-coverings. Each plate is securely attached to the concrete base by 53 improved-type anchors. The anchors are bent in eight directions to prevent any movement of the plate.

An illustrated bulletin is being offered by the company that describes 12 advantages of using this steel flooring. *Stelcon Industrial Floors Inc.*

Circle No. 16 on Readers' Service Card

New splicing technique

A new high-speed splicing procedure has been developed for use on the Type LT belting that is manufactured by Extremultus Inc. It is said that power transmission belting can be spliced and back in operation in less than 1 hr. by the use of this method. Previous splicing methods required from 8-10 hrs. *Extremultus Inc.*

Circle No. 17 on Readers' Service Card

Packaged static dc power supplies

Packaged static dc power supplies for motor drives—newest development in the trend to non-rotating, low-maintenance industrial equipment—are now available to the industry.

The company expects to find applications on feed drives for machine tools, conveyors, paper machine helper drives, supercalender drives, etc.

This static power supply may be used instead of the motor-generator set normally used in processing lines and in similar applications where non-reversing adjustable speed drives without pumpback currents are required. *International General Electric Co. Div., General Electric Co.*

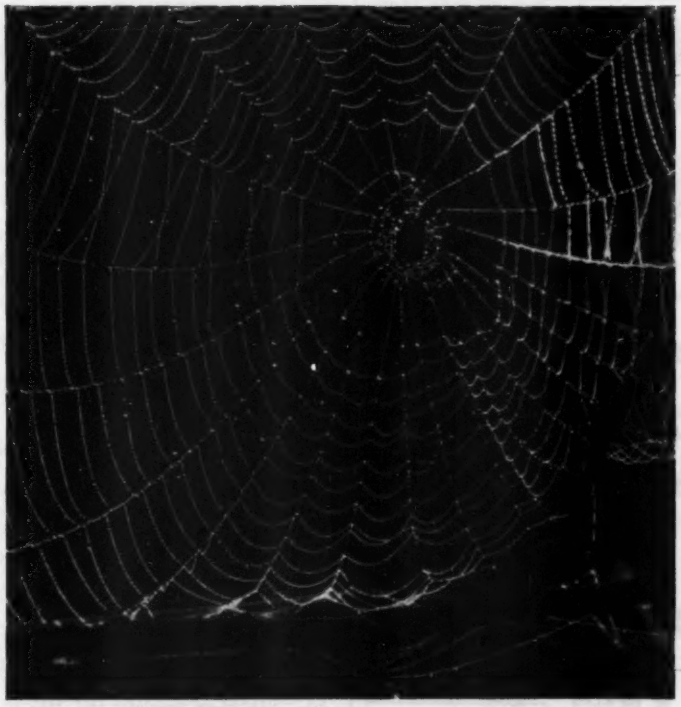
Circle No. 18 on Readers' Service Card

Pulpwood handling machine

Sam Frisby, area forest superintendent for International Paper Co., Pineville, La., has built a pulpwood handling machine of interesting design. It is said that the ma-

BASIC ENGINEERING PRINCIPLE

THE PROPER DESIGN
IN THE RIGHT LOCATION



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Employee's Manlift

ELEVATOR

Eliminate stair climbing — save time — reduce employee fatigue. The endless belt provides continuous up and down transportation to and from sampling and operating floors. Easy and safe to operate with ready-at-hand stop and go controls and the exclusive Humphrey Safety Features.

Can be installed in any Multi-Floor Building

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Faribault, Minnesota

Humphrey is the original Manlift Elevator, made continuously since 1887.

New Products . . .

chine has been operating successfully for two years.

This unit is a tractor-loader combination consisting of three principal components—a conventional Ford tractor with front wheels removed; a pulpwood cart, and a simple yet effective tractor hoist for yarding 5-ft. bolts and placing them in a rack on the cart. *American Pulpwood Association.*

Circle No. 19 on Readers' Service Card

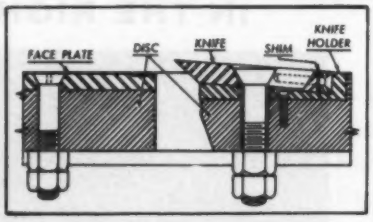
Mechanical seals

A complete line of mechanical seals are now being manufactured. The mechanical seal is a shaft-sealing device used to replace the packing in a conventional centrifugal pump stuffingbox or the gland of a rotating shaft.

Using precision-lapped faces, it is designed to withstand extreme conditions of temperature and pressure without leakage.

The company states that the mechanical seal is available for all makes, models and size of centrifugal pumps, as well as for other rotating shaft applications. *Borg-Warner Corp.*

Circle No. 20 on Readers' Service Card



Knife assembly for chippers

A new knife assembly has been introduced for the Carthage 39-in. slab chippers. One important advantage of this assembly is that chip lengths can easily be changed simply by changing the knife holders (see drawing above). There are no field adjustments, thus eliminating guess work. The knives can be shimmed in the shop and are the correct width when placed in the disc, thus eliminating field shimming.

The new knife assemblies are used in conjunction with replaceable alloy steel wear plates, firmly bolted to the disc, which result in further economies in the operation of these chippers. *Carthage Machine Co.*

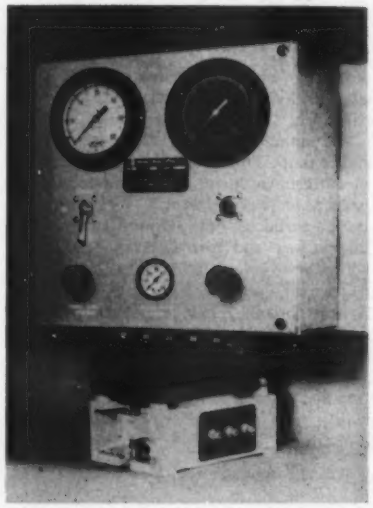
Circle No. 21 on Readers' Service Card

Supercalender drive

A new semi-conductor adjustable speed drive featuring a 150 hp static power supply, static speed regulator and static tension regulators make up the new supercalender drive system now available.

The static power supply differs from the normal motor-generator sets in that the conversion from ac to dc power is accomplished with only static (non-rotating) devices. This power supply is desirable for the lower horsepower supercalender applications because of lower total, installed cost and reducing of continued maintenance. *General Electric Co.*

Circle No. 22 on Readers' Service Card



Automatic tension controller

A new production model of an automatic tension controller has recently been announced by Pneumatic Applications Co. The major improvement in the new model involves the re-packaging of the equipment with a more compact control panel in a heavy steel enclosure and cast aluminum transmitter housing (see photo.) The redesign permits easier installation, simpler operation and greater adaptability.

This tension controller is used on any winding or unwinding process where it is possible to guide the web or strip over a load-sending roll with 10° or more of fixed angular wrap. It is utilized in combination with air-actuated friction brakes, clutches or any type of pneumatically controllable variable speed drive system.

In the event of failure of any component in the automatic system, the controller can be manually operated to prevent loss of production while repairs are being made. *Pneumatic Applications Co.*

Circle No. 23 on Readers' Service Card

Spectrofluorometer

Two new types of spectrofluorometers have been added to the standard line offered by Farrand Optical.

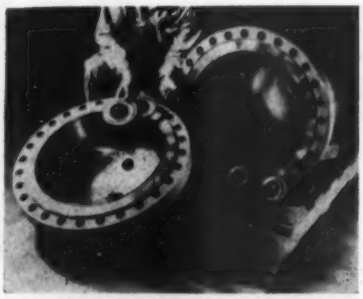
One type is a dual-purpose instrument for spectrofluorometric transmission measurements in the spectral region from 220 to 650 mu.

The second type is a triple-purpose instrument that can be utilized as a spectrofluorometer or for reflectance measurements of solid samples such as textiles, plastics, paints, paper, etc.

All spectrofluorometers can be supplied for manual or automatic operation with

recorders or for oscilloscope presentation. *Farrand Optical Co. Inc.*

Circle No. 24 on Readers' Service Card



Tantalum reactor

The development of a tantalum-lined reactor has been jointly announced by Pfaudler Co. Div., Pfaudler Permutit Inc. and Haynes Stellite Co., Div. of Union Carbide Corp.

The 30-gal. reactor is designed to operate at 650°F and 500 psi. reactor chamber consists of a .030 tantalum liner with a ⅜-in. outer shell of type 430 stainless steel.

Because of tantalum's remarkable corrosion resistance, the development of this reactor will be of major significance to the pulp and paper manufacturers. Tantalum is said to be fully resistant to all acids except hydrofluoric.

According to the company tantalum-lined reactors can be custom fabricated at the present time. There are no specific limitations as to size. *Pfaudler Co.*

Circle No. 25 on Readers' Service Card

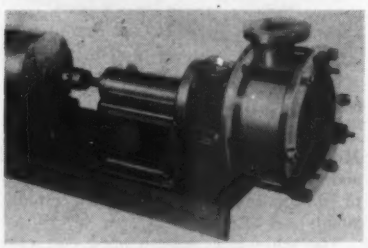
Heavy industrial conveyor belt

A heavy industrial conveyor belt made of non-porous Koroseal polyvinyl chloride belt has been developed.

This Koroseal belt has been especially designed for pulp mills, chemical plants, assembly plants—wherever resistance to cutting oils and greases and a smooth, non-marking cover is required.

Belt widths are available up to 48 in. and are reinforced with from two to four plies of 42-oz. fabric. *B. F. Goodrich Co.*

Circle No. 26 on Readers' Service Card



All-purpose centrifugal pumps

Pictured above is one of the models introduced in a new line of all-plastic PVC centrifugal pumps that is now available to the market.

These pumps are constructed to offer the broadest possible range of chemical resistance as well as the non-contaminating transfer of sensitive solutions. Simplicity of maintenance is also featured in this new line. By removing just six bolts, the casing may be opened and the impeller inspected or replaced without breakdown of the entire pump. The heavy-duty shaft is constructed of stainless steel with a PVC cover on the wetted end. It can be removed from the pump from either direction.

Available in four pump sizes, these units offer capacities from 10-180 gpm with discharge heads to 100 ft. Solution temperatures to 140°F can be handled. *Vanton Pump & Equipment Corp.*

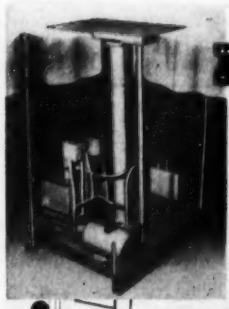
Circle No. 27 on Readers' Service Card

Motors with sealed starting switch

The new sealed starting switch concept is the major feature of a new line of electric motors.

Complete containment of the switch, capacitor, thermostat and terminal board makes these critical parts completely impervious to dirt, dust, oily accumulations and processing materials fines. The switch package capsule has a unique design that allows inspection and checking of the switch without damaging the container's protection efficiency.

This new starting switch design is being



"Weld Bilt" PRODUCTS

Weld-Bilt Thru-the-Floor

HYDRAULIC LIFT TABLE SIMPLIFIES PAPER CUTTING OPERATION

Actually suspended below the floor, with "table top" at floor level, this special Weld-Bilt Hydraulic Lift unit saves its cost in skid-handling ease in a production cutting operation for a leading paper manufacturer. Lifts a skidload of paper inches at a time to cutting machine level for effortless unloading.

Designed by Weld-Bilt hydraulic engineers, this unit is actuated by single hydraulic ram through convenient foot pedal or push button. Capacity, 3500 lbs., with 40" lift, it can be adapted for other products, cartons, sheet metal, packaged products, in heavier capacities as required—for machine or conveyor operation.

If you have a lifting or handling problem, you, too, will profit by calling for Weld-Bilt engineering aid. Write today.

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MATERIALS HANDLING ENGINEERS
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New Products . . .

adapted to every model of single-phase motors manufactured by the *Electric Motor Div., A. O. Smith Corp.*
Circle No. 28 on Readers' Service Card

Motor-driven liquid valve

A heavy-duty liquid valve has been designed for remote control operation. The opening and closing of the valve is accomplished by a built-in electric motor. A fail-safe mechanism is incorporated that immediately closes the valve should a power failure occur.

This valve is manufactured in two standard sizes. One model is for 3-in. pipe and the other for 4-in. pipe. Other sizes can be custom built to order. Both models are available in stainless steel for highly-corrosive applications. *Gemco Inc.*
Circle No. 29 on Readers' Service Card

Stainless steel exchangers

The needs of chemical and process industries for an economical stainless steel exchanger can now be met with the Ross SSCF series that are now being produced.

Nineteen sizes are available, in one-, two- and four-pass designs. Parts are fully-standardized and stocked for quick assembly. Important design features include: tubes roller-expanded into tube sheet holes for tight fit; transverse baffling; close tolerances between shell and baffles as well as tubes and baffles, and interchangeable parts. *Ross Heat Exchanger Div., American-Standard.*
Circle No. 30 on Readers' Service Card

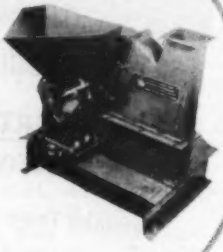
MARATHON SOUTHERN

Installs MURCO

Multiple knife PULPWOOD CHIPPER

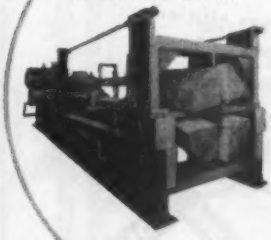
1 — MURCO 104" 10-knife pulpwood chipper with patented MURCO Uni-Chip knife mounting. The machine is driven by a 1000 HP, 360 RPM synchronous motor.

40" 6 knife RECHIPPER WITH STATIONARY SPOUT



1 — MURCO 40" 6-knife rechipper with stationary spout.

HYDRAULIC WOOD SPLITTER

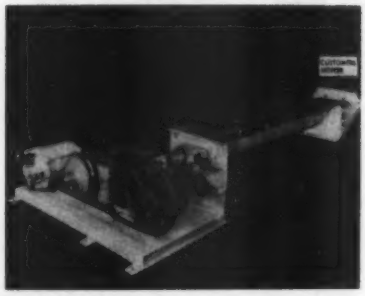


1—MURCO Hydraulic Wood Splitter for splitting wood up to 36" dia. x 72" in length.

MURCO

Manufacturers Since 1883

D. J. MURRAY MANUFACTURING CO. WAUSAU • WIS



Bulk feeders

A new self-contained line of bulk feeders that can be bolted to the base of customer's hopper has been announced. This line of screwfeeds covers a range from 0-3000 cu. ft/hr. of dry granular material. The unit consists of a totally-enclosed motor, reducer, drive, guard, screw and housing with a flanged inlet and a flanged outlet.

The company is offering custom-built hoppers of any material if desired. All units are shipped completely assembled. *M-H Standard Corp.*
Circle No. 31 on Readers' Service Card

Moisture tester

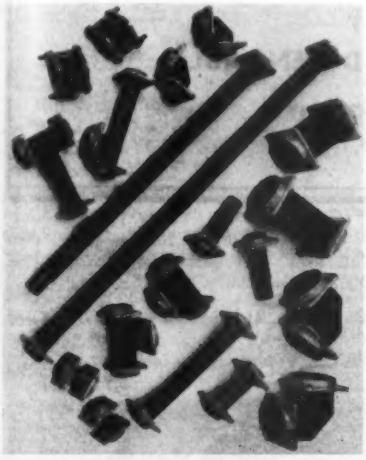
With the new OHAUS Model No. 6000 Moisture Determination Balance (pictured above), moisture content of a wide variety of materials can be determined rapidly, simply and accurately.

The tester is a self-contained unit comprising a magnetically-damped analytical-type chain balance as the weighing system and is combined with an infra-red heating element which provides even concentrated

heat to the sample in a specially-designed heating chamber.

In addition to moisture determination, this balance can be used for direct weighing up to 10.0 gms with a sensitivity of 10 milligrams. *Ohaus Scale Corp.*

Circle No. 32 on Readers' Service Card



Corrosion-proof pipe

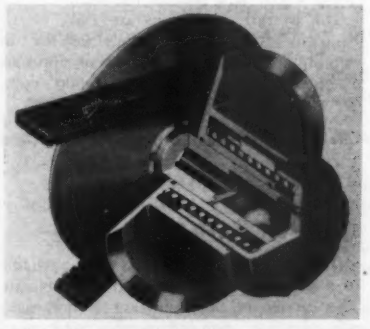
Pictured here is a completely re-engineered, corrosion-proof piping system composed of standardized pipe lengths and fittings. It can be fitted easily in the field with only a hacksaw and a wrench because it is made of impervious graphite (not carbon).

The system utilizes glass fibre armor to protect against physical abuse and standard ASA flange bolt circles to permit attachment to existing equipment or other pipe.

Impervite pipe is recommended for use at temperatures to 340°F at pressures to 75 psi hydrostatic (50 psi steam). It is supplied in standard lengths of 72 in. Shorter lengths can be made up easily in the field by cutting a standard length with a hacksaw, then attaching the flange.

The impervious graphite material from which this pipe is extruded is unaffected by practically all corrosives except a few highly-oxidizing agents. *Falls Industries Inc.*

Circle No. 33 on Readers' Service Card



Variable-speed pulleys

This is one of the models in the Wood's MS series of variable-speed pulleys that incorporate a new design which eliminates corrosion as well as freezing and sticking.

Bearing surfaces are re-oiled from an oil reservoir with each rotation of the pulley. The continuous rotational pumping action of the flange hub on the sleeve constantly renews and evenly distributes the oil film on the bearing surfaces.

The new series consists of five pulleys with ratings of 2, 3, 5, 10 and 15 hp. *T. B. Wood's Sons Co.*

Circle No. 34 on Readers' Service Card

Rotary cutter

A new rotary cutter that can cut from rolls or in synchronization with in-process work has been announced.

The manufacturer states that pieces from 2 in. to 60 in. long can be cut by the new machine. Among other features rated desirable by converters, it provides infinitely variable cutoff lengths at speeds up to 50 cuts per minute.

The cutter can be supplied with or without a slitting device for longitudinal cutting. *Hobbs Mfg. Co.*

Circle No. 35 on Readers' Service Card

Thermo-drive actuator

The expansive force of Freon vapor has been utilized in the development of a new actuator to position valves and other final control elements with precise and repeatable accuracy.

The unit, called the Thermo-Drive actuator, is a device that uses no compressed air, motors, gear trains, pumps, oil, amplifiers or relays of any kind. It develops a

Just Like Panning for Gold!
You'll get exceptionally low "first cost"
You'll use minimum power
You'll need less maintenance
with the
Kalamazoo "Side Hill" Washer
These practical slide washers give a better and more effective wash job than other washing methods. They may also be used as thickeners and savealls. These units are designed by Kalamazoo engineers — experts in serving the paper industry for more than 90 years. Our experience enables us to completely prefabricate the units of top quality materials. Installation supervision can be furnished.
Laboratory size units are available for experimental purposes in determining the proper angle and screen mesh.
Write today for information on capacities and cost estimates.
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New Products . . .

force of 500-lb. return-spring force, giving a total stroke length of 1.5 in. and a response speed of 0.1 in. per second. Precise null-balance positioning is said to be possible at any point within the limits of the actuator. *Swartwout Co.*

Circle No. 36 on Readers' Service Card

Paper roll edge protector

In the photo above, application is being shown of a new roll edge protector. Made of molded corrugated, these protectors are claimed to provide the closest approach to sponge rubber resilience at paper prices.

The new material is trade-named Spring-Pak. It is furnished in double rolls of 250 ft.—equivalent to 500 linear feet per roll. The edge protector is pre-cut and pre-scored for trim, easy application to paper rolls. *Pillo-Pak of New England Inc.*

Circle No. 37 on Readers' Service Card

High-capacity nozzles

The Bete K is a new series of high-capacity nozzles that are manufactured to give finer break-up and are also said to be non-clogging.

In their design, these new nozzles employ three separate orifices from each of which 2 jet impinges on a deflector plate. Here the jets are broken up and intermingled to form a full-cone spray.

Seven standard models from 1½- to 8-in. pipe sizes are available. They cover a flow rate range of 20-3000 gpm. *Bete Fog nozzle Inc.*

Circle No. 38 on Readers' Service Card

Valve positioner

A new and different valve positioner is now being marketed. Known as the Model J, it is said to be capable of matching or exceeding the speed and sensitivity of modern pneumatic controllers.

Model J is known to be capable of an infinite number of stroke lengths up to 8 in. in any combination of control forms through a variety of models. Linearity is guaranteed to be better than 1 per cent regardless of stroke length. *Conoflow Corp.*

Circle No. 39 on Readers' Service Card

Vacuum and hydraulic automatic web guides

New hydraulic models or the original vacuum-type models of automatic web guides are now available to the market.

In this 110 series, the vacuum type is the fastest-responding, while the hydraulic type is recommended for installations requiring greater power—as in the case of metal foil, heavy board, rubber, etc. Both styles are said to be extremely accurate and able to make corrections within .010 in., plus or minus. *Stanford Engineering Co.*

Circle No. 40 on Readers' Service Card

Air-powered hoists

A air-powered hoist line is being introduced to the market in link chain and roller chain models of 1000- and 2000-lb. capacity. Both hook- and trolley-type hoists are available. Units are controlled by a choice of push button pendant or pull cable control.

Standard lifting speeds, utilizing 90 lbs. psi of air pressure, range from 6 - 40 fpm in the 1000-lb. model under full load and 3 - 20 fpm with the 2000-lb. model with full load. *Yale Materials Handling Div. Yale & Towne Mfg. Co.*

Circle No. 41 on Readers' Service Card

Portable air vibrator

A new portable air vibrator that can be attached to almost any type of frame, bin, box or table without use of bolts is now available.

Known as the Cleveland 3-in. VGV, the vibrator has jaws that open to 2 in. and is attached simply by tightening the vise-like clamp which is a part of the unit.

The overall dimensions are 14¾ × 13 × 6 in. It is approximately 90 lbs. in weight. With air consumption of approximately 20 cfm, it develops 3600 vpm. *Cleveland Vibrator Co.*

Circle No. 42 on Readers' Service Card

Spray-on lubricant

The Molylube lubricant is now available in a new, easy-to-handle aerosol spray can. The carrier in this lubricant is non-toxic, non-corrosive, non-inflammable and positively free of any abrasive impurities or resins. *Bel-Ray Co. Inc.*

Circle No. 43 on Readers' Service Card

NEW LITERATURE

Books

ADVENTURES IN OPPORTUNITY. By William Barton Marsh. Published by William Barton Marsh Co., 9 East 48th St., New York, N. Y. Pages: 168. Price: $3.75.

This is the story of Herbert Carpenter, a unique man whose individual success through personal integrity and hard work, has given an impressive service and contribution to the American scene.

Carpenter's character, as portrayed in Marsh's highly readable text, shows an indominable spirit coupled with a high degree of creative imagination and horse sense.

This is the type of book that should find many readers among business men who enjoy business success stories. In a sense, too, it is an historical document, for it gives inside information about a number of important political and economic situations that have transpired during the past half century.

EPOXY RESINS. By Irving Skeist. Published by Reinhold Publishing Corp., Dept. B-196, 430 Park Ave., New York 22, N. Y. Pages: 293. Price $5.50.

A clear description of such versatile new materials as casting and potting compounds, adhesives, plasticizers has been given by the author. Explanations of both the how and why of epoxy uses are also given.

The text gives the reasons behind each formulation to enable the reader to choose from the confusing and sometimes contradictory maze of available information. It also clarifies the puzzling array of trade names and presents up-to-date formulations and manufacturing procedures.

USDA Reports

SIX NEW REPORTS summarizing results of research on paper and other wood-fiber products, package cushioning and fungus attack on cellulose materials have recently been published.

No. 2122—Experiments on the Groundwood and Sulfite Pulping of Subalpine Fir.

No. 2128—Pulping of Northern White-Cedar and Tamarack.

No. 1163—Grinding of Loblolly Pine, Relation of Wood Properties and Grinding Conditions to Pulp and Paper Quality.

No. 2120—The FPL Dynamic Compression Testing Equipment for Testing Package Cushioning Materials.

No. 2123—Hardboard from Lodgepole Pine, Engelmann Spruce and Douglas-Fir.

No. 2116—A Review of Literature on the Enzymatic Degradation of Cellulose and Wood.

Single copies are available free by writing to the Director, U. S. Forest Products Laboratory, Madison 5, Wis.

Manufacturers' Publications

These items are numbered for your convenience. Copies of the publications may be requested at no obligation through our Readers' Service Dept. Use the handy business reply card which accompanies this issue.

Chemical-resistant pulley

Mercury Industries Inc. has released a four-page bulletin and technical data sheet illustrating the Mermaid vinyline chemical-resistant pulley. This pulley is said to be strong, lightweight, chemically inert, non-toxic, tasteless, odorless non-sparking and weather-resistant.

Circle No. 44 on Readers' Service Card

Valves

Ohio Brass Co. has available condensed catalog pages covering its complete line of bronze, globe, angle, check, gate, radiator and specialty valves. Material is so listed in the pages that the reader can quickly find pressure ratings, recommended uses, features and roughing-in dimension for each valve in a wide range of sizes. Pages are available separately or in a set.

Circle No. 45 on Readers' Service Card

Selectifier screens

Shartle Div., Black-Clawson Co. describes and illustrates the latest models of selectifier screens for pulp and paper mill application in a new 12-page bulletin. The booklet covers design, construction and application data on both the 24-P model and the larger 36-P totally-enclosed pressurized screens. Installation diagrams and templates are included.

Circle No. 46 on Readers' Service Card

Surface condensers

Southwestern Engineering Co. has prepared a bulletin that illustrates the Sweco surface condensers. It also provides information on the general, construction and operational features of this product.

Circle No. 47 on Readers' Service Card

Three-knife trimmer

Lawson Co. Div. Miehle-Goss-Dexter Inc. has produced a new brochure describing the firm's recently introduced series "C" three-knife rapid trimmer. Photographs and diagrams demonstrate the machine's versatility, speed and ease of operation.

Circle No. 48 on Readers' Service Card

Industrial burners

Iron Fireman Mfg. Co. describes the new series of AirRing industrial burners with built-in fuel and air systems in a bulletin just issued. These packaged units are available for gas, oil or dual fuel; natural or induced draft and for Scotch or any other type boiler. Cutaway views, diagrams and photographs illustrate how the integral air register improves combustion and reduces installation costs by eliminating need for ignition arch, air tunnel, checkered combustion chamber or other underfloor construction.

Circle No. 49 on Readers' Service Card

Belt puller

Transall Inc. has recently issued a bulletin describing the design and operation of the Transall belt puller. The product is made of steel, is lightweight, quick to install and no bolts are required. Curved contact surfaces will not damage belt.

Circle No. 50 on Readers' Service Card

Cleaning equipment

Sellers Injector Corp. has released a bulletin describing the company's hydraulic jet which is used for hot "jet-stream" cleaning in plant maintenance and tank cleaning.

Circle No. 51 on Readers' Service Card

Gums

Penick and Ford Ltd. Inc. has released a revised catalog titled, The Penford Gums. Directed to the textile and paper industries, its text is both technical and descriptive with

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information provided on the characteristics, properties and many uses of the various gums.

Circle No. 52 on Readers' Service Card

Weighted gauge cocks

Lunkenheimer Co. has made available a new circular describing the Renewo weighted gauge cocks as an effective aid to boiler operation. The circular gives instructions on installing, adjusting, renewing, reversing and replacing them.

Circle No. 53 on Readers' Service Card

Brochures on aluminum foil

Cochran Foil Corp., subsidiary of Anaconda Co., has published two brochures, one of which describes the various methods of laminating, coating and printing of aluminum foil. The other brochure describes the designing, printing and properties of foil cartons.

Circle No. 54 on Readers' Service Card

Surface treating agent

E. I. du Pont de Nemours & Co. Inc. has recently published a booklet giving up-to-date information on the possible uses of Quilon in the paper industry. According to the company, Quilon chrome complex has gained broad acceptance in the paper industry because of its ability to provide water repellency, improved wet strength and size, good release characteristics, etc. to paper products.

Circle No. 55 on Readers' Service Card

Longer life from V-belt drives

B. F. Goodrich Industrial Products Co. is issuing a 12-page manual titled, "How to Get Longer Life from V-Belt Drives". The manual tells how to detect belt trouble, diagnose failures, correct drive troubles, how to select and how to install V-belts. A list of maintenance tips is also given.

Circle No. 56 on Readers' Service Card

Worm gear

De Lavel Steam Turbine Co. describes the convenient mounting for top, bottom, vertical, side-wall or angled drive of durable Verso worm gear speed reducers in a new bulletin. Complete horsepower and torque data are given. Speed reduction ratios ranging from 70:1 to 5:1 are also available for heavy-duty applications. Dimensions of the worm gear units in various sizes are diagrammed, and materials and design of the interchangeable components are also described.

Circle No. 57 on Readers' Service Card

Aftercoolers

Ross Heat Exchanger Div., American-Standard, presents the A-100 line of Ross pipeline aftercoolers in a new eight-page bulletin. Among principal features described and illustrated are: steel shell construction, removable corrosion-resistant tube bundle, counter current flow design and a new advanced centrifugal moisture separator. The fully-standardized parts are said to eliminate high engineering costs and long delays involved in custom fabrication.

Circle No. 58 on Readers' Service Card

Material handling systems for the paper industry

Hyster Co. has published a field report that describes material handling systems at five leading paper industry plants. The study includes the handling of newsprint, corrugated containers, specialty products and general paper products.

Circle No. 59 on Readers' Service Card

Thermocouple assemblies and pressure sealing glands

Conax Corp. is offering a 36-page catalog of the company's complete line of thermocouple assemblies and pressure sealing glands. The catalog introduces new additions such as the Type "C" bare wire thermocouple glands, the roll temperature thermocouples and other Conax products.

Circle No. 60 on Readers' Service Card

Glassed steel reactors

Pfaudler Co. Div., Pfaudler Permutit Inc., describes a complete line of small-capacity glassed steel reactors. Specifications contained in the bulletin include capacities, weight and dimensions for all "P" series models, as well as detailed information on standard and optional components. Schematic drawings for each design size show nozzle, piping and drain locations.

Circle No. 61 on Readers' Service Card

Storage structures

Sprout, Waldron Co. Inc. announces the availability of an eight-page technical and illustrated booklet on storage structures and related materials handling equipment.

Circle No. 62 on Readers' Service Card

Cold caustic pulping

Sprout, Waldron & Co. Inc. has announced the availability of a detailed technical report on cold caustic pulping of mixed hardwoods. The pulping operation and production quality control testing is described, as are the considerations that led to the choice of the cold caustic process. The results of studies of pulping and papermaking variables are also shown and discussed.

Circle No. 63 on Readers' Service Card

Transmission bulletin

T. B. Wood's Sons Co. has prepared a bulletin covering the company's complete line of sheaves, variable-pitch sheaves, V-belts, flat-belt pulleys, pillow blocks, flange units, take up bearings, couplings and timing-belt drives.

Circle No. 64 on Readers' Service Card

Waste treatment

Dow Chemical Co. has completed a 32-page bulletin about Dowpac—the company's new plastic packing material used in the biological oxidation of liquid wastes. According to Dow, the bulletin is of interest to all persons concerned with waste disposal—both industrial and municipal. It contains illustrated information on the product's physical properties, assembly instructions and operational characteristics.

Circle No. 65 on Readers' Service Card

Grout cement

Nukem Products Corp. has just published a bulletin describing a new grout cement called Supertite. This product provides sanitary flush joints when used on ceramic tile, brick, etc.

Circle No. 66 on Readers' Service Card

Suction pumps

Warren Pumps Inc. has issued a new bulletin featuring Warren type DMB and DB ball bearing, horizontal split-case, double-suction centrifugal pumps for white water, fan pump service and general water service. Detailed specifications, a selection table and outline dimensions are also included in the publication.

Circle No. 67 on Readers' Service Card

Corrugated shipping boxes

Hinde & Dauch discusses nine basic rules for efficient stacking and loading in a new booklet titled, "How To Stack and Load Corrugated Shipping Boxes". Copy and illustrations describe methods of estimating storage space, distributing load weights, handling, identification, and the use of gates, bulkheads, barricades and weatherstripping.

Circle No. 68 on Readers' Service Card

Gas turbines

Clark Bros. Co. in a new bulletin gives details of the operating experience with the Mark TA 750/1000 kw gas turbine. Salient design features, types of fuels, plus applications in process industries are thoroughly discussed. Also included is an assessment of the integrated turbine-boiler package and the probable future trends in turbine application.

Circle No. 69 on Readers' Service Card

Skid-turner

Southworth Machine Co. is offering a bulletin that illustrates the performance of the Southworth skid-turner. Detailed specifications and uses of the product are also given.

Circle No. 70 on Readers' Service Card

Eight Publications for Papermakers

Pulp and Paper, Volume 1 (Casey)	$18.00
Pulp and Paper, Volume 11 (Casey)	18.00
Paper and Paperboard Making (Williamson)	6.00
Technology of Paper Coating	2.00
Lessons in Papermaking—Part 1	1.50
Lessons in Papermaking—Part 2	1.50
Notes and Observations on Beaters	1.00
Trouble on the Paper Machine	.75

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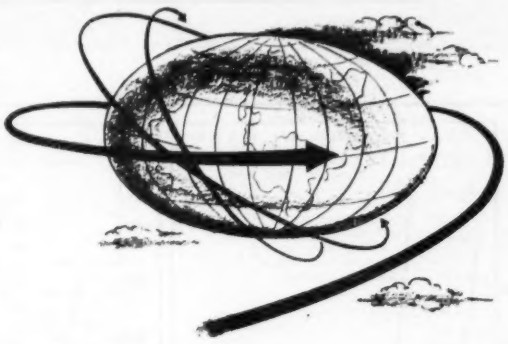

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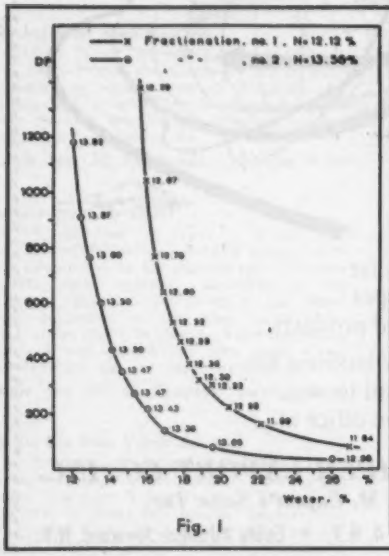

Fig. 1

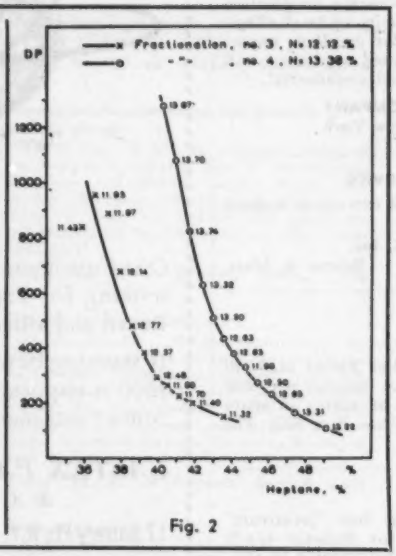

Fig. 2

Fractional precipitation of cellulose nitrates

One of the starting materials (I) was a commercial cellulose nitrate containing 12.12 per cent nitrogen and with a D.P. of 640. From this sample two other samples were prepared by further nitration with nitric acid, phosphoric acid and phosphorus pentoxide. These were termed Ia (with 13.56 per cent nitrogen) and Ib (that contained 13.38 per cent nitrogen). Besides these, another commercial sample (II) containing 12.3 per cent nitrogen and with a D.P. (degree of polymerization) of 475 was also used. The fractionation of these samples was carried out from acetone by the successive additions of either water or heptane. In the case of I and Ia, water was the precipitating agent, and the fractions were termed 1 and 2. In the case of I,Ib and II, heptane was the preciptant, and the fractions are termed 3, 4, and 5. Thus, I served in comparing the two precipitants. It was found that the fractionation and the precipitabilities were influenced both by the chain length and by the degree of substitution (D5). The latter was more important when water was the precipitant than when heptane was used.

A comparison between the various distribution curves showed that heptane is not suited as a preciptant when the D.S. is too low; whereas for nitrates with a relatively high D.S., heptane seems to be the better precipitant and to give the more reliable results.

Fig. I shows the D.P. of the fractions as a function of the concentration of water in the solvent mixture. The various numbers on the body of the graph show the nitrogen content of each fraction. Fig. 2 shows the D.P. of the fractions as a function of the heptane concentration in the mixture.

Eight references, four graphs and five tables are included. K.Aejmelaeus and H.Sihtola . *Paperi ja Puu* (Finland) 40, No. 9, 437-442 (1958) (in English).

The printability of photogravure papers

Up to the present, the assessment of photogravure paper quality has been based entirely on practical experience. These studies, carried out in Helsinki, are based on efforts to explain the ways in which the reproduction qualities of photogravure papers can be affected.

Thus, the effects of paper smoothness, compressibility and absorptivity have been investigated in their relation to ink accessibility, the tone rendering of the paper and the unity of screen pattern.

In measuring the properties of these paper properties, a Bekk-Ullstein apparatus was used for determining the smoothness and the compressibility of paper. In determining the compressibility, the authors used an additional weight, and the compressibility is reported as a ratio between the smoothness rate obtained with this extra weight and the normal smoothness rate. The experiments indicate that since smoothness and compressibility may both be demanded of a photogravure paper, there must be a certain ratio between these properties. When the paper has a high degree of smoothness (*e.g.* 700-800 as measured by the Bekk-Ullstein instrument) no compressibility is demanded of the sheet. However as smoothness diminishes, there must be a corresponding increase in compressibility. For example, when the smoothness is only 90, the compressibility must be about 1.8—as measured by the above apparatus. If the smoothness falls much under 90, even a very high compressibility cannot improve the printability of the paper. Even when a sheet meets the requirements of smoothness and compressibility, there is no absolute guarantee of a good printing impression. Only the test on a printing machine can furnish a final idea of suitable printability.

Oil absorptivity of the sheet is mainly of significance in binding the ink on the printing surface. When the oil absorption is proportional to the porosity, it may also have significance regarding the ink accessibility of the paper. On the other hand, it has also been shown that an ample ink transfer can be obtained on an entirely unabsorbent surface like that of cellophane.

Six references, five graphs, six photos and two tables are given. Pekka Hyvärinen, Paavo Manner and Erkki Aaltio *Paperi Ja Puu* 40, No. 10, 509-516 (in Finnish with an English summary).

Changes in fiber-to-fiber bond during the pulping operation

This is the report of an extensive study made at the Austrian Wood Research Institute in Vienna.

Up to the present, one of the criteria used in judging semichemical pulps consists in determining the correlation between their chemical treatment and their ease of defibration. The means used is that of measuring the power consumption during defibration in a refiner or other defibrating equipment. When carried out under carefully-regulated conditions, the shearing strength serves in measuring the changes occuring in fiber-to-fiber bonding in wood (i.e. ease of defibration) that has been subjected to chemical and termal pretreatments.

The authors describe a technique for measuring shearing strength over a wide range which includes wood that has just been softened without more than a very slight loss in weight, and at the other extreme, normal pulps in yields of about 50 per cent or less. In each case the wood was treated with the appropriate liquor, and in the case of "controls", withdrawn immediately when the desired maximum pulping temperature had been reached.

(Continued on page 710)

MARKET QUOTATIONS

RAGS (Domestic)

New Cotton Cuttings

The following are brokers' and large dealers' average buying prices for sizeable lots in cents per pound f.o.b. New York:

	per cwt.
No. 1 white shirt cuttings	13.00— 13.50
Soft unbleached muslins	15.50— 16.00
Fancy shirt cuttings	4.50— 5.00
No. 1 percales	5.50— 6.00
No. 1 washables	2.25— 2.50
No. 1 light silesias	6.50— 7.00
No. 1 light prints	4.75— 5.00
Light flannelettes	6.50— 7.00
Cottonades	2.75— 3.25
Blue overall cuttings	6.75— 7.25
Blue cheviots	6.75— 7.25
Canton flannels, bleached	10.50— 11.00
Canton flannels, unbleached	10.50— 11.00
Osnaburg cuttings	9.50— 10.50
Underwear cuts, bleached	14.50— 15.00
Underwear cuts, unbleached	14.50— 15.00
Sun tan khaki cuttings	5.00— 5.50
American linen cuttings	6.75— 7.25

Cotton Rags

The following are prices, cents per pound, paid by dealers and brokers f.o.b. New York:

	per cwt.
No. 1 roofing (Chicago)	.70— .75
No. 2 roofing (Chicago)	.50— .55
Twos and blues, repacked	1.50— 1.75
Thirds and blues, repacked	1.50— 1.75
No. 1 whites, repacked	—
No. 1 whites miscellaneous	—
No. 2 whites, repacked	—
No. 2 whites, miscellaneous	—

RAGS (Foreign)
(ex dock New York City)

New Rags

per cwt.

Nominal:
- New dark cuttings
- New mixed cuttings
- New light silesias
- Light flannelettes
- Unbleached cuttings
- New white cuttings
- New light oxfords
- New light prints

Old Rags

per cwt.

Nominal:
- No. 1 white linens
- No. 2 white linens
- No. 3 white linens
- No. 4 white linens
- No. 1 white cottons
- No. 2 white cottons
- No. 3 white cottons
- No. 4 white cottons
- Extra light prints
- Ordinary light prints
- Medium light prints
- Dutch blue cottons
- French blue cottons
- French blue linens
- Checks and blues
- Linsey garments
- Dark cottons
- Old shopperies

ROPE and BAGGING
F.o.b. and ex dock New York City

Gunny No. 1, domestic	—
Gunny No. 1, foreign	—
No. 1 manila rope, domestic	—
No. 1 manila rope, foreign	—
New burlap cuts (soft)	—
Sisal strings	—
Mixed strings	—

WASTE PAPER

The following are prices, dollars per net ton, paid by brokers and large dealers for carload quantities of baled stock, f.o.b. cars New York:

No. 1 hard white envelope cuttings	90.00— 95.00
No. 1 hard white shavings	80.00— 85.00
No. 1 soft white shavings	50.00— 55.00
Soft white shavings, uncoated	50.00— 55.00
Fly leaf shavings No. 1	25.00— 27.50
Fly leaf, woody, No. 1	23.00— 25.00
Mixed colored shavings	21.00— 23.00
No. 1 books and magazines	17.00— 18.00
Ledger stock, white, No. 1	50.00— 52.50
Ledger stock colored, No. 1 (Midwest ship)	30.00—
New manila envelope cuttings (free of groundwood)	60.00— 65.00
New manila envelope cuttings (containing groundwood)	50.00— 55.00
Manila tab cards	75.00— 80.00
Colored tab cards	50.00— 55.00
New northern kraft envelope cuttings	60.00— 65.00
Triple sorted kraft, 100%	30.00— 35.00
No. 1 old kraft	30.00—
White news cuts, No. 1	55.00— 60.00
No. 1 overissue news	—
Folded news, special	15.00— 16.00
Folded news, ordinary	13.00— 14.00
Old corrugated boxes	22.00— 23.00
New jute corrugated cuts	19.00— 20.00
Mill wrappers	11.00— 13.00
Boxboard cuttings	7.00— 9.00
No. 1 mixed paper	7.00— 9.00

CHEMICALS
F.o.b. New York City

Alum, ammonium	
Granular, bags, works, cwt.	4.30—
Lump, drums, works, cwt.	5.05—
Powdered, drums, works, cwt.	5.20—
1-Arginine, drums, kilo	90.00—
Blanc Fixe	
Direct process, bags, c.l., works, ton	145.00—
L. c. l., ton	155.00—
Bleaching Powder, drums, cwt.	—
Casein, domestic acid precipitated	
30-mesh bags, 10,000-lb. lots or more, shipping point, lb.	.56—
80-mesh bags, 10,000-lb. lots or more, shipping point, lb.	.64—
China Clay, domestic dry-ground, airfloat, 99%	
325-mesh bags, c.l., Georgia works, ton	10.00— 12.00
300-mesh bags, c.l., Georgia works, ton	13.50— 14.50
Imported, white, lump, bulk, c. l., ex dock Phila, Portland, Me., gross. ton	20.00— .35.00
Chlorine, liquid	
Tanks, single units, works, freight equaled, cwt.	3.15—
Glycerine, refined (CP, USP) 98%, drums c. l., delivered lb.	.29⅜—
Litharge, commercial powdered	
Barrels, c. l., works, freight equaled lb	.14¾—
Rosin, gum, c. l., f.o.b. New York, cwt.	
K, M	9.75—
N	9.80—
WG	9.85—
WW	10.40—
Rosin, wood, c. l., f.o.b., shipping point, cwt.	
K, M	7.80— 8.15
N	7.90— 8.20
WG	8.25— 8.55
WW	8.60— 8.95
Saltcake, domestic, bulk works, 100% Na_2SO_4 basis ton	28.00—
Soda Ash	
Dense, 58%, paper bags, c.l. works, cwt	1.90—
Light, 58%, paper bags, c.l. works, cwt	1.85—
Soda, caustic	
Flake, 76%, drums, c. l. works, freight equalled, cwt	5.20—
Solid, 76%, drums, c. l. works, cwt.	4.80—
Sodium Silicate	
40°Be, 1:3.2, turbid, drums, c. l., works, cwt.	1.55—
52°Be, turbid, 1:2.4, drums, c. l., works, cwt.	2.65—
Starch	
Pearl, 140-lb. bags, cwt.	7.51—
Pearl, 100-lb. bags, cwt.	7.36—
Powdered, 100-lb. paper bags, cwt.	7.48—
Sulfur, crude	
Bulk, c. l. mine, contract, long ton	23.50—
Talc	
Domestic, fibrous, N. Y., grd., bags, c. l. works, ton	28.00—
Canadian, ground, bags, c. l. works, ton	20.00— 35.00
Titanium Pigment	
Calcium-rutile base, regular, bags, c. l., lb.	.09⅜—
High-tinting, drums, c. l., lb.	.14⅜—
Zinc Oxide Pigment, American process	
Lead-free, bags, c. l. freight allowed, lb.	.14½—
Leaded, 35%, bags, c. l., freight allowed, lb.	.15⅛—

WOOD PULP

Quotations on domestic and Canadian pulp, dollars per short air-dry ton delivered consuming mills including basic allowances, follow:

Bleached sulfite, No. 1	155.00—
Bleached sulfite, Canadian	155.00—
Unbleached sulfite	135.00—
Unbleached sulfite, Canadian	135.00—
Bleached soda	150.00—
Bleached soda, Canadian	150.00—
Kraft, bleached hardwood	152.00—
Kraft, bleached	157.00—
Kraft, bleached southern	160.00—
Kraft, bleached Canadian	160.00—167.50
Kraft, unbleached southern	120.00—
Kraft, unbleached, Far West	125.00—
Kraft, unbleached Canadian eastern	135.00—
Kraft, unbleached Canadian western	120.00—125.00
Kraft, semi-bleached southern	140.00—
Sulfite screenings	—
Sulfate screenings	—

Quotations on imported wood pulp, dollars per short air-dry ton on dock American Atlantic ports, follow:

Bleached sulfite, Swedish, freight allowed	155.00—
Bleached sulfite, Norwegian, del'd with limited freight allowance	155.00—
Bleached sulfite, Finnish, freight allowed	155.00—
Unbleached sulfite, Swedish, freight allowed	135.00—
Unbleached sulfite, Finnish, freight allowed	135.00—
Kraft, unbleached, Swedish, freight allowed	125.00—
Kraft, unbleached, Finnish, freight allowed	125.00—
Kraft, bleached, Swedish, on dock	157.50—162.50
Kraft, bleached, Norwegian	155.00—

PAPER

Quotations are mill quotations Chicago

Boards (prices per ton, delivered in Chicago, 10 tons or more):	
Plain chip	107.50
News vat lined chip	110.00
.009 chip, rolls	100.00
Filled news	111.50
Solid news	114.50
White vat lined chip	144.50
Chip tube and can stock	112.50
Single manila lined chip	162.50
Single jute lined chip	147.50
Container, 42-lb.	
Kraft liner (per 1000 sq. ft.)	2.68
White patent coated	
.020	175.00
.018	177.50
.016	182.50

Book Paper (f.o.b. Chicago, c.l. cases per cwt):	
No. 1 enamels	20.05
No. 2 enamels	19.05
Machine-coated, 45- to 100-lb.	15.05— 18.50
60-lb. + uncoated offset, 25 × 38 (2000 lb.)	17.05
"A" grade English finish untrimmed, 25 × 38 (2000 lb.)	16.15
Rag Content Bond (white, 5000 to 10,000-lb. sub 20, ream sealed cartons):	per cwt
100% rag	64.70
75% "	49.65
50% "	37.80
25% "	31.90
Rag Content Ledger (white, 5000 to 10,000 lb., ream sealed cartons):	
100% rag	65.85
75% "	50.80
50% "	39.00
25% "	33.10

Sulfite Bond (white, 5000 to 10,000-lb. sub 20, ream sealed cartons):	
No. 1	22.50
No. 2	21.75
No. 4	20.35
Sulfite Ledger (white, 5000 to 10,000-lb., ream sealed cartons):	
No. 1	23.70
No. 2	22.95
No. 4	21.55

Newsprint (contract base price)	per ton
Rolls, standard	135.00
Sheets	Standard differentials

Kraft Wrapping — Natural (standard rolls 9- and 15-in. diam.)	per cwt
70-lb. and heavier	8.50
60-lb.	8.75
50-lb.	9.00
40-lb.	9.25
35-lb.	9.75
30-lb.	10.50
25-lb.	11.25
20-lb.	12.25
No. 1 Kraft Butcher — Pink	
	per cwt
40-lb. only	10.00

(Sheets — Plus 50c cwt)

Pulps withdrawn at intermediate stages were also examined.

Although emphasis was placed on high yield pulps, the studies include the usual sulfite process as well as the sodium bisulfite and neutral sulfite digestions. All of

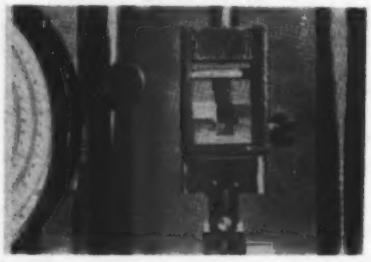

Fig. 3

these were carried out on a laboratory scale. Maximum cooking temperatures and pulping periods were also varied.

Results are tabulated and shown graphically. The shearing strength testing apparatus is fully described and shown (in part) in Fig. 3. This illustrates the general set-up with the suspension device, sliding carriage (holding the treated wood samples) etc. The marked and often sharp decrease in shearing strength and yield becomes evident from the graphically-presented data.

The relationship between paper quality and the shearing strength is discussed and several tables show the effects of cooking changes (in temperature, time and liquor composition) not only on the shearing strength, but also on the beating time required to reach a specific degree Schopper-Riegler, and on the percentage screenings, breaking length and burst of the sheet.

The results appear to be of interest to an industry that is making every effort to increase pulp yields with the minimal damage to the resulting fibers and to pulp quality.

Thirty-four references, three photos, 10 graphs and 3 tables are given. Hans Sadler and Othmer Trantina. *Das Papier* **12**, 553-567 (1958) (in Germany with English and French summaries).

Sorption of water vapor by wood constituents

The sorption isotherms of water vapor were determined on a sample of *Eucalyptus regnans* and on the holocellulose, hemicellulose and cellulose fractions prepared from the same wood. This was also done in the case of Klason lignin and methanol lignin. The latter was prepared by Bland's method (cf. THE PAPER INDUSTRY, September 1958, p. 397).

From these data it was possible to make an approximation of the relative contributions (to the total water vapor sorption by the wood) made by the three major components, cellulose, hemicellulose and lignin. The shapes of the various isotherms are quite similar for all fractions, but the magnitude of sorption hysteresis differed widely and was greater for the lignin fraction than for the carbohydrate fractions. The sorption by methanol lignin appeared to be anomalous and was only about one half that of the less reactive Klason lignin, due probably to physical changes that had taken place during the mathanol extraction and precipitation.

Eight graphs, one extensive table and 23 references are included. G.N.Christensen and Kathleen E.Kelsey. *Australian J. Applied Sci.* **9**, No. 3, 265-282 (Sept 1958).

Fiber alignment in various papers

Although fiber orientation in test sheets made by using the Rapid Köthen apparatus show a uniform (or nearly uniform) orientation in all directions, this is not true in the case of sheets made on commercial paper machines. In such cases, fiber alignment is much greater in the machine direction than in the cross-machine direction. In the case of fibers orientated in the machine direction, there is a greater alignment of fibers on the wire side than on the upper side of the sheet.

In equipment developed at the Technische Hochschule in Darmstadt for counting fibers in various orientations, the sectors adjusted to an angle of 90° show no identity of fiber distribution. This is attributed to undirected and more or less violent turbulence during sheet formation. If the head boxes of the paper machines are equipped with a slice system, an increased longitudinal orientation of the fibers occurs at higher machine wire speeds. A better distribution of fibers in all directions is noted when the stock flow behind the slice reaches the optimum speed of a pressure headbox. Every deviation from the ratio of unity in the speed of flow onto the wire to that of the machine wire causes a change in the fiber orientation. When this ratio drops, more and more fibers in the sheet are oriented in the machine direction. About 70-80 per cent of the fibers visible on the sheet surface are largely (more or less) straight. A relationship between fiber orientation and paper strength could be shown by showing the positions of the fibers by means of a wire shake under controlled constant hydrodynamic conditions.

Twenty-five references, nine figures and eight tables are given. Manfred Judt. *Das Papier* **12**, 568-578 (1958) (orginal in German with English and French summaries).

Studies on mercury as a health hazard in groundwood and paper mills

The comprehensive studies included the determination of the concentrations of mercury in the air of those mills that used organic mercury compounds as preservatives or slimicides.

cury concentrations. This is shown in Fig. 4, in which A is a spectrophotometer, B is a heating unit, C is a cooling device, and D is the air pump. The operation of this apparatus is described, and numerous results are tabulated. Urine analyses were also made, so as to note any excretion of mercury by the mill workers.

Apparently, when a groundwood mill used the normal dosage of some organic mercury compound, the permitted limit for air-born mercury (100 gammas per cubic meter of air) was not reached, and workers were not exposed to a toxic dose with-

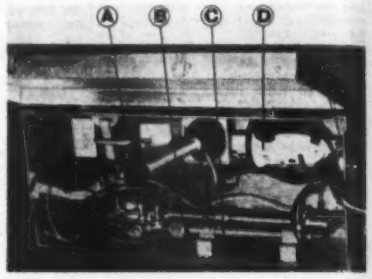

Fig. 4

in an eight-hour working shift. Most of the mercury in the air was metallic. It was also shown that methyl mercuric compounds and the commonly used phenyl mercuric acetate led to about the same mercury concentrations in the mill atmosphere. In paper mills the air contained very low concentrations of mercury even when unusually high dosages of the organic mercury compounds were used. The present findings confirm those of previous investigators.

Eighteen tables, six figures and 14 references are included. Av.S.Freyschuss, O.Lindström, K.D.Lundgren and A.Swensson. *Svensk Papperstidn.* **61**, 568-580 (1958) (in Swedish with English and German summaries).

Adsorption of ligin and hemicellulose on cellulose

Yllner and Enström (*Svensk Papperstidn.* **59**, 229 (1956) have shown that in the kraft cook cellulose in contact with black liquors absorbs and tenaciously retains hemicellulosic material. This depends in part on the type of cellulose and on the concentration of the hemicelluloses in the liquor. The present authors have shown that besides the hemicelluloses retained, lignin is also sorbed by the cellulose — this lignin emanates from that dissolved by the cooking liquor. Furthermore, the authors present data that only when the hemicellulose-lignin bonds have not been split (by hydrolysis) will this hemicellulose sorption occur. For example, when certain fibrous agricultural residues were prehydrolyzed, it was possible to show that lignin, not hemicelluloses, was sorbed. In the present work cotton linters were used as the adsorbing agent. Four figures, two tables and 10 references are included. G.Centola and D.Borruso. *L'industria della carta*, **12**, No. 8/9,91-95 (1958) (in Italian with brief English summary).

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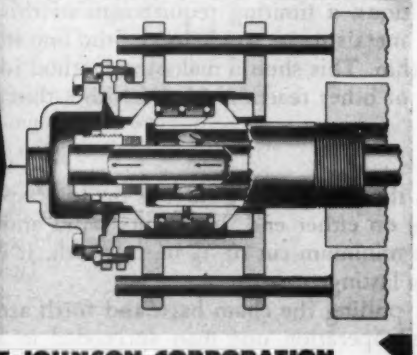

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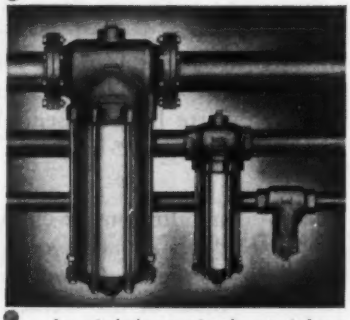

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PAPER INDUSTRY

Whither?

... in production, processes, new products, markets

1959 Production of paper and board

U. S. Department of Commerce estimates that 1959 production of paper and board will be 32 million tons — a four per cent increase over the 1958 production and a two per cent increase over the record output of 1956.

With current inventories of paper and board being at low levels, a strengthening in distributor and consumer inventories is anticipated for the coming year thereby adding a plus factor for the 1959 production.

Plastic printing plates

Plastic printing plates can now be made by a new process developed by E. I. du Pont de Nemours & Co. Inc. The use of such plates, it is claimed, reduces the time required for making electrotype plates by more than 4 hrs.

The plate is exposed under ultraviolet light to a negative of the material to be printed. Wherever the light passes through the negative it hardens the plastic into a printing surface, while the unexposed areas remain soft and are subsequently removed by a treatment with sodium hydroxide. Tests have shown that the plate can survive as many as 1.2 million impressions.

Tree seedlings by hydroponics

In experiments conducted at Laval University, Canada, seedlings of Norway spruce were grown successfully in nutrient solutions. The seedlings grew to heights of 4-6 in. in the course of one summer showing root systems 3-5 times better developed compared with seedlings grown in nurseries.

The seedlings were later planted, resulting in losses of less than three per cent in areas known for their unfavorable growth conditions.

The nutrient solution used contained more ammonium salts than used for agricultural plants. Iron was added as a tartrate. Also added was a complete list of essential micro-nutrients. The pH of the nutrient solution was kept at 4.5-4.7.

Ultrasonic welding

In ultrasonic welding, electrical energy is converted by means of a transducer to mechanical vibrations of ultrasonic frequency which are then transmitted to the welding tip. This results in intimate contact between the particles of the welded metals. It has been shown that ultrasonic welds have the strength of conventional welds and greater uniformity.

Under present conditions, a limiting requirement of this technique is that one of the pieces of metals to be welded, i. e., the one in contact with the welding tip must be thin. This should make the method ideally suitable for cladding of digesters or other reaction vessels with a thin sheet of non-corrosive metal.

A new tree girdler

A new girdler known as the Brady tree girdler is made of special chipper-tooth chain and a handle on either end. It permits rapid and effective girdling of trees, assuring a minimum cut of $\frac{5}{8}$-in. in width. It is low in cost, safe in operation and long lasting.

Trees are girdled by pulling the chain back and forth around the tree. During one demonstrated operation one man succeeded in girdling 1507 trees in the course of $7\frac{1}{2}$ hrs.

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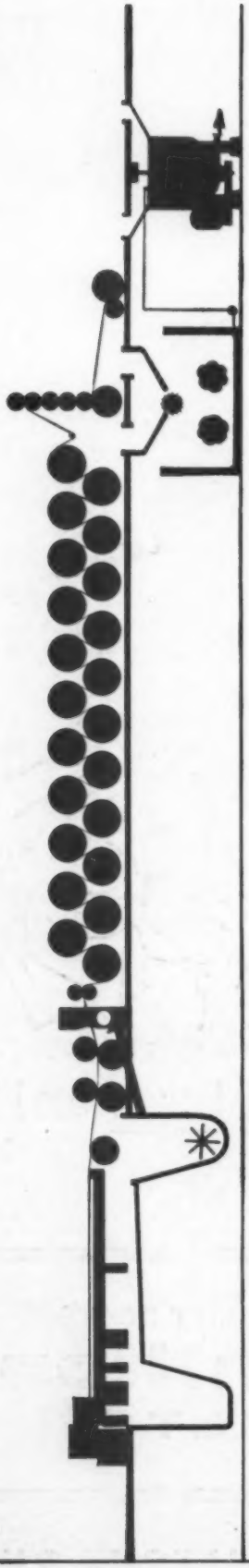

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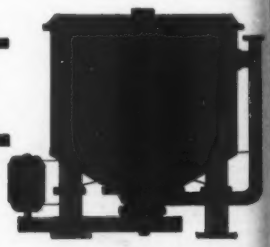

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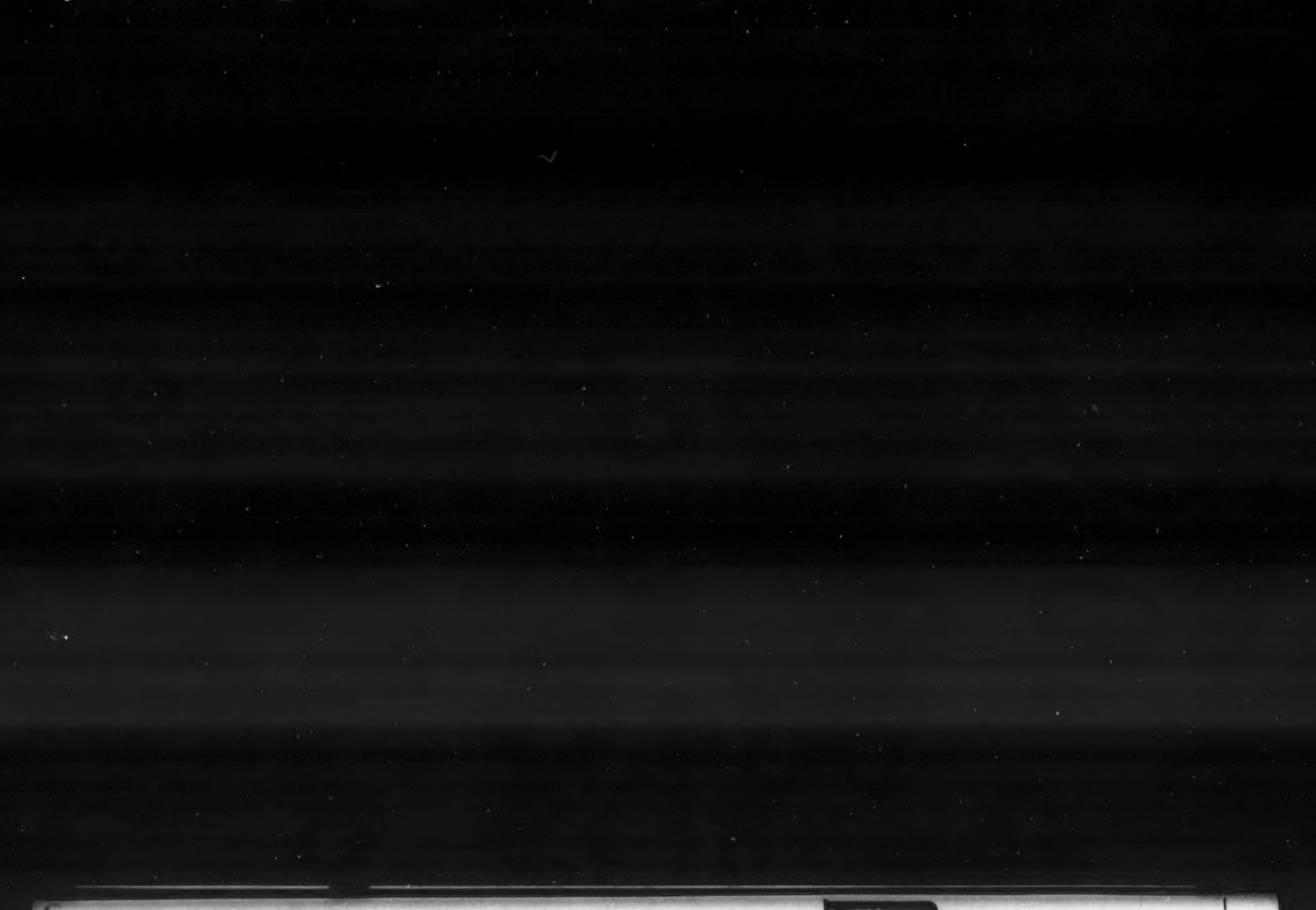
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